3rd INTERNATIONAL RESEARCHERS, STATISTICIANS AND YOUNG STATISTICIANS CONGRESS

24 - 26 MAY 2017 SELÇUK UNIVERSITY

Abstract Book

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CONTENTS

KEYNOTE SPEAKERS

Professor Ismihan Bayramoğlu

Ismihan Bayramoglu (Ismihan Bairamov) is presently Professor of Mathematics and Statistics and Dean of Faculty of Arts and Sciences, Izmir University of Economics, Turkey. He graduated from Faculty of Applied Mathematics of Azerbaijan State University and received his PhD degree in probability and statistics from Kiev University, Ukraine in 1988. After his graduation he worked in Institute of Cybernetics of Academy of Sciences of Azerbaijan, Azerbaijan State University and Azerbaijan Aerospace Agency as a researcher and lecturer. Between 1993 and 2001 he worked as a professor teaching probability and statistic courses in Ankara University and from 2001 he teaches in department of Mathematics of Izmir University of Economics. His research interests focus mainly in theory of statistics, probability, theory order statistics, nonparametric statistics and multivariate distributions and copulas. He has published numbers of articles and chapters in books dealing with wide range of theoretical and applied issues of theoretical statistics and applications. He has organized two international conferences devoted to the advances in characterizations and models and theory of ordered statistical data in Turkey. He has received science prize of Ankara University in 2001 for his contributions. He serves as an associate editor and as a guest editor of several international journals and is Editor in Chief of Journal of The Turkish Statistical Association.

The Title of Talk: "*Bounds and new ordering of distribution functions"*

Professor Narayanaswamy Balakrishnan

Professor N. Balakrishnan is a Distinguished University Professor in the Department of Mathematics and Statistics at McMaster University and a world renowned statistician. For nearly 30 years, he has been providing many valuable services to his students, his department, the university, and the academic community at large. Professor Balakrishnan received his Ph.D. (Statistics) from the Indian Institute of Technology, Kanpur, India in 1981. From there he held various positions. At McMaster University, he has had a successful career in teaching, research and service to the university and community. As a supervisor, he has supervised over 60 M.Sc. students and over 50 Ph.D. students. Worldwide, he has given and continues to give lectures and workshops to students and faculty alike. He has been a visiting professor in universities around the world. He is an elected member of the International Statistical Institute, a fellow of the American Statistical Association, a fellow of the Institute of Mathematical Statistics and a Fellow of the Turkish Statistical Association. He has served as Associate Editor for several journals and Editor-in-Chief for Communications in Statistics (Theory & Methods and Simulation & Computation) for many years. He was also the Editor-in-Chief for the Revised Edition of the Encyclopedia of Statistical Sciences. Among his various areas of expertise, his research areas include ordered data, survival analysis and distribution theory. With nearly 300 co-authors and approximately 500 published articles, along with several authored and co-authored books, he is likely one of the most prolific researchers in the world.

The Title of Talk: "*Exact non-parametric inference for multiple ordered data"*

Professor Olcay Arslan

Olcay Arslan is full Professor in Ankara University Faculty of Science Department of Statistics since 2010. She received the undergraduate and the M.Sc degrees in mathematics from Ankara University, Ankara, Turkey in 1983 and 1986 respectively. She received Ph.D. degree in statistics from University of Leeds, Leeds, UK, in 1993. She worked as Assistant Professor in University of Çukurova between 1993-1997, she worked as Associate Professor in University of Çukurova between 1997-2003, in St. Cloud State University between 2001-2003 and 2005-2006. She has been in many universities as a visiting research positions such as University of Leeds, University of Rutgers, Cornell University, State University of Rio de Janeiro and Charles University. She is an executive editor of the Journal of Statistical research and editorial board in Hacettepe Journal of Mathematics and Statistics. She is a member of Institute of Mathematical Statistics and American Statistical Association. Some of her research interests areas are; Robust statistical analysis of multivariate data, Robust regression estimation, Multivariate distributions, Robust statistical modeling using t-distribution, Generalized t-distribution and robust modeling using generalized t-distribution, Elliptically contoured distributions.

The Title of Talk: "*A Unified Approach to Some Multivariate Skew Distributions*"

Professor Hon Keung Tony Ng

Hon Keung Tony Ng received the M.Sc. and Ph.D. degrees in statistics from McMaster University, Hamilton, ON, Canada, in 2000, and 2002, respectively. He is currently a Professor of Statistical Science with Southern Methodist University, Dallas, TX, USA. He is an Associate Editor of Communications in Statistics, Computational Statistics, Journal of Statistical Computation and Simulation, and Statistics and Probability Letters. His research interests include reliability, censoring methodology, ordered data analysis, nonparametric methods, and statistical inference. Dr. Ng is a fellow of the American Statistical Association, an elected senior member of IEEE and an elected member of the International Statistical Institute.

The Title of Talk: "*Analysis of System-based Reliability Data*"

Professor Ömer Öztürk

Omer Ozturk is a professor of Statistics at the Ohio State University His research interest is in ranked set and related sampling designs, robust and nonparametric statistical inference. He frequently visits the United States Census Bureu as a Summer Scholar at Census. He is a Fellow fo American statistical Association. He serves as an associated editor in several journals including Environmental and Ecological Statistics, Statistics and Probability Letters, Communication in statistics.

The Title of Talk: "*Two-Stage Cluster Samples with Ranked Set Sampling Design"*

COMMITTEES of IRSYSC 2017

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Olcay ARSLAN, Ankara University, TURKEY
Ping Shing CHAN, The Chinese University of Hong Kong, HONG KONG
Reha ALPAR, Hacettepe University, TURKEY

HISTORY of IRSYSC

1. I. Young Statisticians Symposium, 10-11 September 2013, Hacettepe University, Ankara.
2. Researchers and Statisticians Congress, 12-13 Eylül 2013, Hacettepe University, Ankara.
3. II. International Researchers, Statisticians and Young Statisticians Congress, 4-8 May 2016, Hacettepe University, Ankara.
4. III. International Researchers, Statisticians and Young Statisticians Congress, 24-26 May 2017, Selcuk University, Konya.

SHORT COURSES

Fikri AKDENIZ
"Semi-parametrik Regresyon Modellerinde Parametre Tahmin Yöntemleri"

Fikri ÖZTÜRK
"Çok Boyutlu Verilerin Analizi"

Halil AYDOĞDU
"Yenileme Süreci"

Hülya ÇINGI
"Örnekleme Teorisi"

Murat DOĞAN
"Yapısal Eşitlik Modellemesi"

Ahmet PEKGÖR
"R Programında Temel İstatistik Analizler"

Levent ÖZBEK
"Pi'de Rasgelelik"

İsmail Hakkı KINALIOĞLU
"Adobe Photoshop ve Illustrator"

INVITED SESSIONS

Erol EĞRİOĞLU
"Computational Intelligence in Forecasting"

H. Hasan ÖRKCÜ
"*Statistical Optimization*"

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CONGRESS PROGRAMME

3ND INTERNATIONAL RESEARCHERS, STATISTICIANS AND YOUNG STATISTICIANS CONGRESS (IRSYSC 2017) PROGRAM					
24 MAY 2017 (Wednesday)					
08.30-17.00	**Registration**				
09.00-10.00	**Opening Ceremony**				
10.00-10.15	**Whirling Dervishes Show**				
10.15-10.30	**Turkish Music Concert**				
10.45-11.30	**Plenary Speaker İsmihan Bayramoğlu** **"Bounds and new ordering of distribution functions"**				
11.45-12.30	**Plenary Speaker Narayanaswamy Balakrishnan** **"Exact non-parametric inference for multiple ordered data"**				
12.30-14.00	**Lunch**				
14.15-15.15	**Parallel Sessions I**				
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Session Chair	***Cihangir KAN***	***Erol EĞRİOĞLU***	***Mehmet ÜNVER***	***Akbar ASGHARZADEH***	***Fikri AKDENİZ***
1	*45- A Compound Distribution and Properties* *Obadia ADELEI** *Coşkun KUŞ* *İsmail KINACI*	25-A hybrid forecasting method based on exponential smoothing and multiplicative neuron model artificial neural network *Erol EĞRİOĞLU** *Ufuk YOLCU* *Eren BAŞ* *A.Zafer DALAR*	68-Some new type of summability methods defined via Bochner integral for random elements *Havva ULUÇAY** *Mehmet ÜNVER*	330- Smallest Pareto confidence intervals and regions under progressive Type-II censoring *Akbar ASGHARZADEH** *M.ZARE*	Semiparametrik regresyon modellerinde parametre tahmin yöntemleri
2	98- Joint Reliability Importance in m-consecutive-k,l-out-of-n:F Systems *Cihangir KAN**	26-A Robust learning algorithm for Pi-sigma artificial neural networks based on M-estimator *Eren BAŞ** *Erol EĞRİOĞLU* *Ufuk YOLCU*	69-A theoretical approach to construct a subadditive fuzzy measure *Ezgi TÜRKASLAN** *Mehmet ÜNVER*	161- Sparsity Estimation in Compressive Sensing *Jiafeng WANG** *Jun YUA*	
3	151- Model-based Estimation of Computed Tomography Images *Fekadu L. BAYISA** *Jun Yu*	27-Bagging Fuzzy Ridge Regression Functions Approach for Forecasting *A.Zafer DALAR** *Eren BAŞ* *Ufuk YOLCU* *Erol EĞRİOĞLU*	70-Statistical and Strong Convergences in Hausdorff Topological Spaces *Mehmet ÜNVER** *Şeyhmus YARDIMCI*	51-Some bivariate random threshold models based on order statistics and concomitants *Ayşegül EREM** *İsmihan BAYRAMOĞLU*	
4	15-Detection of Outliers in Survival Data by Using Press-Type Residuals *Deniz İNAN**	153-A New Intuitionistic Time Series Fuzzy Inference System *Özge ÇAĞÇAĞ YOLCU** *Eren BAŞ* *Ufuk YOLCU* *Erol EĞRİOĞLU*	102-On a new class of multivalued weakly Picard operators *Murat OLGUN** *İshak ALTUN* *Gülhan MINAK*	100-A new compound distribution for overdispersed binomial data *A.İhsan GENÇ**	
5	109-Confidence interval based on robust estimators for the difference of two independent nonnormal population variances *H.Esra AKYÜZ*,* *Hamza GAMGAM*		163-Numerical Solution of Finding the leading coefficient to the time derivative of parabolic equation with nonlocal boundary conditions *Fatma KANCA**		
15.15-15.30	**Coffee Break**				

15.30-16.30	**Parallel Sessions II**				
	Room 1 ENG	**Room 2 ENG**	**Room 3 ENG**	**Room 4 ENG**	**Room 5-Short Course**
Session Chair	***Halil AYDOĞDU***	***Fulden CANTAŞ***	***Murat GÜL***	***F. Zehra DOĞRU***	***Fikri ÖZTÜRK***
1	41-Dynamic Performance Evaluation of Three-State k-out-of-n:G Systems Using Lifetimes in terms of Order Statistics *Funda İŞCİOĞLU**	105-Investigation of the Relationship between Economic Growth and Environmental Pollution in OECD Countries *Fatih ÇEMREK** *Hakkı POLAT*	84-A Probabilistic Approach To Stock Exchanges Using Varıable Lenght Markov Chains *Murat GÜL**	140-Robust mixture regression modeling based on the Generalized M (GM)-estimation method *F.Zehra DOĞRU** *Olcay ARSLAN*	Çok Boyutlu Verilerin Analizi
2	59-Numerical Computation of the Variance Function in Geometric Processes *M.Hilmi PEKALP** *Halil AYDOĞDU*	261-Forecasting the Amount of Sulfur Dioxide (SO2) and Particulate Matter (PM10) in the Air Using Grey Prediction and ARIMA Methods *Ahmet ALÇI** *Miraç MURAT* *Şükrü ÖZŞAHİN*	67-Comparison of Vuong and Clarke Tests for Bivariate Copula Selection *Çiğdem TOPÇU GÜLÖKSÜZ** *Nuri ÇELİK*	29-Credit Scoring by Artificial Neural Networks based Cross-Entropy and Fuzzy Relations *Damla İLTER** *Ozan KOCADAĞLI*	
3	62-Non-parametric inference for α-series process *Ömer ALTINDAĞ** *Mahmut KARA* *Halil AYDOĞDU*	83-Comparison of Classification Performances of Artificial Neural Networks, Adaptive Neuro-Fuzzy Inference System and Logistic Regression *İmran KURT ÖMÜRLÜ* *Fulden CANTAŞ** *Mevlüt TÜRE* *Hakan ÖZTÜRK*	84-Portfolio Selection Using Stepwise Regression *Murat GÜL**	284-Classification of EEG Signals for Detection of Epileptic Seizures using Artificial Neural Networks based on Wavelet Transforms and PCA *Ezgi ÖZER** *Ozan KOCADAĞLI*	
4	134-Parameter estimation of generalized Rayleigh distribution based on ranked set sample *Melek ESEMEN** *Selma GÜRLER*	88- The Comparison of Wavelet-based Features and Classification Methods in EEG Signals *Mevlüt TÜRE* *Hakan ÖZTÜRK** *İmran KURT ÖMÜRLÜ* *Nefati KIYLIOĞLU* *Fulden CANTAŞ*	164-Alternative Estimation Methods for the Estimation of Frechet Distribution Parameters *Ebru GÜNDOĞAN AŞIK** *Y. Murat BULUT* *Arzu ALTIN YAVUZ*	113-Comparison of artificial neural network and multiple linear regression models for the prediction of body mass index *Nuriye SANCAR** *Sahar S. TABRİZİ*	
5	142-Alpha Power Lomax Distribution: Properties and Applications *Y. Murat BULUT** *Fatma Zehra DOĞRU* *Olcay ARSLAN*		158-Linear regression model with change points *Cansu GELMEDİ** *Aylin ALIN*	280-Prediction of Number of Passengers in Public Transportation by Using Artificial Neural Network Method *Mehmet Cabir AKKOYUNLU* *Kadir BÜYÜKÖZKAN** *Şule Itır SATIOĞLU* *Coşkun ÖZKAN*	
16.30-16.45	**Coffee Break**				

16.45-17.45	**Parallel Sessions III**				
	Room 1 ENG	**Room 2 ENG**	**Room 3 ENG**	**Room 4 ENG**	**Room 5 ENG**
Session Chair	***Ertuğrul AYYILDIZ***	***Onur TOKA***	***Olcay ARSLAN***	***M.Hilmi PEKALP***	***Abdullah YALÇINKAYA***
1	133-Data Envelopment Analysis for Effectiveness of Health Care Systems of Provinces: A Case Study in Turkey *Miraç MURAT* *Ertuğrul AYYILDIZ** *Gökhan ÖZÇELİK* *Şükrü ÖZŞAHİN*	147-Geostatistical estimation of iron content distribution of an ore body using kriging and lognormal kriging techniques – A comparative study *Fırat ATALAY** *Güneş ERTUNÇ*	57-Parameter estimation for skew normal distribution via the maximum Lq-likelihood estimation *Yetkin TUAÇ** *Yeşim GÜNEY* *Şenay ÖZDEMİR* *Olcay ARSLAN*	59-Power Series Expansions for the One-Dimensional Probability Distribution and Mean Value Function in Gamma Geometric Processes *M.Hilmi PEKALP** *Halil AYDOĞDU*	216-Estimation of the mean remaining strength of parallel systems in a stress-strength model based on exponential distribution *Fatih KIZILASLAN**
2	178-Assessing the performances of the universities of Turkey *Hüseyin Avni EŞ** *Coşkun HAMZAÇEBİ* *Seniye Ümit OKTAY FIRAT*	109-Modelling of siesmic data with Gumbel distribution: A case study in Bitlis *H.Esra AKYÜZ** *Hamza GAMGAM*	58-Optimal B-robust estimators for the parameters of the MOEBXII distribution *Yeşim GÜNEY** *Şenay ÖZDEMİR* *Yetkin TUAÇ* *Olcay ARSLAN*	310- Test Statistic for the Significance of a Correlation Coefficient using Jackknife Estimator in Simple Linear Regression *Adeviye İNANDI** *Tolga ZAMAN* *Kamil ALAKUŞ*	229-Maximum Likelihood Estimation for the Parameters of Skew-t Distribution Using Genetic Algorithm *Abdullah YALÇINKAYA** *Birdal ŞENOĞLU* *Ufuk YOLCU*
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4	207-On Queueing Systems with Priority Scheduling and A Numerical Example of M / M /1 System with Two Customer Classes *Abdullah ÇELİK** *Erdinç YÜCESOY* *Murat SAĞIR* *Vedat SAĞLAM*	170-A bonus-malus system design using generalized linear model *Övgücan KARADAĞ ERDEMİR* Meral SUCU*	215-Maximum Lq-Likelihood Estimation for the Marshall-Olkin Extended Burr XII Distribution *Şenay ÖZDEMİR** *Yetkin TUAÇ* *Yeşim GÜNEY* *Olcay ARSLAN*	180- Types of Pareto distribution and some properties *Fahrettin ÖZBEY* *Seval ŞAHİN**	286- Linear contrasts in one-way ANOVA with non-identical and non-normal error distributions *M.Talha ARSLAN** *Şükrü ACITAŞ* *Birdal ŞENOĞLU*
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2	168 Classification of patients according to their risks of restenosis using multi criteria classification models and regression techniques *Halenur ŞAHİN** *Serhan DURAN* *Ertan YAKICI*	306- Wrapping Flexible Skew Laplace Distribution on Unit Circle *Abdullah YILMAZ**	7- Discrete Time Shock Model with Varying Success Probability *Kadir KARAKAYA** *Yunus AKDOĞAN* *Fatih ŞAHİN* *İsmail KINACI* *Coşkun;KUŞ*	300-CuScore control chart parameter optimization for detecting special signals in IMA (1,1) time series *Özgür Cem IŞIK** *Ezgi AKTAR DEMİRTAŞ*	64-Morphological and morphometric analysis of sella turcica by multislice computed tomography *Büşra PİRİNÇ*, Zeliha FAZLIOĞULLARI, İbtahim GÜLER, Nadire ÜNVER DOĞAN, İsmihan İlknur UYSAL, Ahmet Kağan KARABULUT*
3	18- Comparative Analysis of Multi-Criteria Decision Making Methods: A Case Study of the Countries' Environmental Performance Index *Aynur ŞAHİN** *Nimet YAPICI PEHLİVAN*	307-Bivariate Risk Aversion for Utility Copula Functions *Kübra DURUKAN** *Emel KIZILOK KARA* *H.Hasan ÖRKCÜ*	177-Stress-strength reliability under Alt-Exp distribution *Ahmed Abdulsalam ABBAS GOL* İsmail KINACI* *Coşkun KUŞ*	233-Assessing Knowledge and Behaviour of Medicine Leaflet Use for University Students *N.Fırat ÖZKAN** *Berna ULUTAŞ*	297- Antenatal Acute Toxoplamosis Dıagnosis in First Trimester Pregnancy *Ersin ÇİNTESUN** *Mete BERTİZLİOĞLU*
4	290- Multi-objective vehicle routing problem with simultaneous pick-up and delivery: Preemptive goal programming and a heuristic algorithm *F.Pınar GÖKSAL** *Fulya ALTIPARMAK*	308-The Measurement of Directional Dependence for Some Asymmetric Copulas *Emel KIZILOK KARA** *Sibel AÇIK KEMALOĞLU*	20-Geometric-Zero Truncated Poisson Distribution: Properties and Applications *Yunus AKDOĞAN** *Coşkun KUŞ* *Hamid BİDRAM* *Ismail KINACI*	301- A decision support system for the prevention of urban crime *İslam ALTIN** *Muzaffer KAPANOĞLU*	297- Hysteroscopy Complications: Our three year experience *Ersin ÇİNTESUN** *Mete BERTİZLİOĞLU*
5	18- Evaluation of Performance of Simulated Annealing (SA) Algorithm For Multidimensional Knapsack Problems *Aynur ŞAHİN** *Nimet YAPICI PEHLİVAN*	35-Evaluation of Prediction Performance of Some Ridge Estimators in Linear Regression Analysis by K-Fold Cross Validation Method *Aydın KARAKOCA** *Ülkü ERİŞOĞLU* *Murat ERİŞOĞLU*		199-Aerodynamic force estimation of a NACA 0015 airfoil with DBD plasma actuator using artificial neural network *Hürrem AKBIYIK* *Mehmet SEYHAN** *Yahya Erkan AKANSU* *Hakan YAVUZ* *Mustafa SARIOGLU*	115-Comparison of patella morphology in patients with chondromalacia, meniscopathy and in healthy Individuals *Hüseyin GERDAN** *Nadire ÜNVER DOĞAN* *İbrahim GÜLER* *Zeliha FAZLIOĞULLARI* *İsmihan İlknur UYSAL* *Ahmet Kağan KARABULUT*

25 MAY 2017 (Thursday)					
08.30-17.00	**Registration**				
09.30-10.15	**Plenary Speaker Hon Keung Tony Ng** **"Analysis of System-based Reliability Data "**				
10.30-11.15	**Plenary Speaker Olcay ARSLAN** **"A Unified Approach to Some Multivariate Skew Distributions"**				
11.30-12.15	**Plenary Speaker Ömer Özturk** **"Two-Stage Cluster Samples with Ranked Set Sampling Designs"**				
12.30-14.00	**Lunch**				
14.15-15.15	**Parallel Sessions V**				
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Session Chair	***Ufuk YOLCU***	***Özge KURAN***	***Turgut YOKUŞ***	***Vilda PURUTÇUOĞLU***	***Hülya ÇINGI***
1	30-Bootstrapped Robust Pi-Sigma Artificial Neural Network Based on Robust Learning Algorithm *Özge GÜNDOĞDU** *Erol EGRİOGLU* *Ufuk YOLCU* *Eren BAŞ* *Ali Zafer DALAR*	139-Different Estimation Methods for the Parameters of Inverse Weibull Distribution: An Application to Fatigue Lifetime Data *F.Gül AKGÜL** *Birdal ŞENOĞLU*	71-Renewable Energy Optimization Model for Economic External Balance *Turgut YOKUŞ** *Nihal YOKUŞ* *Mehmet ALAGÖZ* *Nimet COŞKUN*	154-Construction of Ovarian Cancer Pathway via Different Mathematical Models *Vilda PURUTÇUOĞLU** *Ezgi AYYILDIZ*	Örnekleme Teorisi
2	171-IID Bootstrap Approach with Rejection Sampling for Pi-Sigma Artificial Neural Network *Ufuk YOLCU** *Erol EGRİOGLU* *Eren BAŞ* *Ali Zafer DALAR*	144- An Application on the Similarity of Turkey to the EU in terms of the Quality of Life Using Clustering Analysis *Ertuğrul AYYILDIZ* *Miraç MURAT** *Şükrü ÖZŞAHİN* *Gökhan ÖZÇELİK*	178-The ranking of industrial engineering departments according to education quality: the case of Turkey *Hüseyin Avni ES** *Coşkun HAMZAÇEBİ* *Seniye Ümit OKTAY FIRAT*	77-Robust Bayesian Estimation in Regression using Ramsay-Novick Distribution *Mutlu KAYA** *Emel ÇANKAYA* *Olcay ARSLAN*	
3	289-An application of ARMA type high order fuzzy time series forecast method based on fuzzy logic relation tables to TAIEX Data *Cem KOÇAK** *Erol EGRİOGLU* *Eren BAŞ* *Ufuk YOLCU*	169-Assessing the biased predictors in linear mixed models via a hypothetical data analysis *Özge KURAN** *M.Revan ÖZKALE*	204-Awareness on ergonomics within the occupational health and safety context *Seren ÖZMEHMET TAŞAN** *Burcu FELEKOĞLU*	78-Effect of Threshold on the Performance Measures of Logistic Regression for Rare Events Data *Olcay ALPAY** *Emel ÇANKAYA*	
4	210-Recurrent Fuzzy Functions Approach Based on Grey Wolf Optimizer for Time Series Forecasting *Nihat TAK**	236-Extracting Clusters between Turkey's Cities Based on Human Development Index: A Comparison of Clustering Methods *Hasan YILDIRIM**	71-Linear Optimization Model Based On Analytic Hierarchy Process: Factory Location Study *Turgut YOKUŞ** *Nihal YOKUŞ* *Mehmet ALAGÖZ*	328-Parameter estimation for the accelerated failure time (AFT) model under type II censoring: Skew t distribution *İklim GEDİK BALAY** *Birdal ŞENOĞLU*	
5		304- The Effect of Macro-Economic Factors on Housing Markets: US Case *Bilgi YILMAZ** *A.Sevtap SELÇUK KESTEL*	211-Evaluating Risk Factors Caused to Work-Related Musculoskeletal Disorders *İrem SARBAT** *Seren ÖZMEHMET TAŞAN*	149-On Evaluation of Divergences for Heavy Tailed Distributions *M.Niyazi ÇANKAYA** *Esra PAMUKÇU*	
15.15-15.30	**Coffee Break**				

15.30-16.30	**Parallel Sessions V I**				
	Room 1 ENG	**Room 2 ENG**	**Room 3 TR**	**Room 4 ENG**	**Room 5- Short Course**
Session Chair	***Levent ÖZBEK***	***Könül BAYRAMOĞLU KAVLAK***	***Erdal GÜNER***	***Derviş TOPUZ***	***Veysel YILMAZ & Murat DOĞAN***
1	14-A Study on Sleep Spindles by Separating Frequency Components of Sleep EEG with Extended Kalman Filtering *Levent ÖZBEK**	110-Estimation of the stress-strength reliability of the standard two-sided power distribution *Çağatay ÇETİNKAYA** *A.İhsan GENÇ*	281- Diagnosis Of Breast Cancer With Machine Learning Classification Methods *Meliha Nur DURAK** *İbrahim DEMİR*	49-Comparison of External Egg Quality Characteristics in White and Brown Shell Eggs *Ali AYGÜN**	Yapısal Eşitlik Modellemesi
2	31-Improved Estimation Strategies in Quantile Regression Model when Errors are Non-iid *Ahmet DEMİRALP** *Yasin ASAR* *Bahadır YÜZBAŞI*	135-An Exploratory Data Analysis of Municipal Waste Treatment Types *Fikret ER* *Cenk İÇÖZ**	75-Principal functions of matrix Sturm-Liouville operators *Nihal YOKUŞ** *Nimet COŞKUN*	49-Effects of Hen Age on External Egg Quality Traits *Ali AYGÜN** *Khalid M. A. MAHROSE* *İskender YILDIRIM*	
3	92-Controlling Bias in Quantile Regression Models Under Gauss-Markov Assumptions *M.Şamil ŞIK** *Bahadır YÜZBAŞI* *Yasin ASAR*	247-Improving the fit of Archimedean Copulas based on l-functions *S.Orhun SUSAM** *Burcu ÜÇER*	76- Spectral Theory of Discrete Analogue of Sturm-Liouville Operator *Nimet COŞKUN** *Nihal YOKUŞ*	167-The Investigation of the Number of Babies Born Alive in Multiple Pregnancies Using Quasi Poisson Model *Gizem ERKAN* *Semra TÜRKAN* *Ozan EVKAYA**	
4	128-Improved Estimation Strategies in Generalized Ridge Regression Models *Bahadır YÜZBAŞI** *Mohammed ARASHI* *S.Ejaz AHMED*	254-Bayes Estimators of Reliability Function of Inverse Gaussian Distribution under Different Loss Functions *Merve AKDEDE** *İlhan USTA*	56- Some Properties of Fuzzy Normed Spaces *Erdal GÜNER**	157- Test Criterion of Model Fit For Fuzzy Models and an Application *Derviş TOPUZ** *İsmail KESKİN*	
5	66-Comparison of Skewnees Procedure for Symmetric Distributions *Nuri ÇELİK** *Çiğdem TOPÇU GÜLÖKSÜZ*	275-Model based inference using ranked set samples *Ömer ÖZTÜRK* *Könül BAYRAMOĞLU KAVLAK**	262-Spectral Analysis of the Impulsive Schrödinger Operators *İbrahim ERDAL** *Şeyhmus YARDIMCI*	157- Interval Regression Model and an Application *Derviş TOPUZ*, İsmail KESKİN, Suat ŞAHİNLER, Yasin ALTAY*	
15.30-16.30	**Poster Presentations**				
1	49-Effects of Ozone on Egg Weight Loss and Hatching Traits in Japanese Quail (*Coturnix coturnix japonica*) Eggs *Sedat KOÇ, Al, AYGÜN**				
2	49-Effects of Ozone on Eggshell Microbial Load in Japanese Quail (*Coturnix coturnix japonica*) Eggs *Sedat KOÇ, Al, AYGÜN**				
3	172- Include or Exclude a Constant Term in Regression Analysis *Ebru TURGAL*, Beyza DOĞANAY ERDOĞAN*				
4	175- Graphical Markov Models for the Categorical Data Analysis *Gamze ÖZEL KADILAR**				
5	175- Deterministic and Stochastic Models of Infectious Diseases *Gamze ÖZEL KADILAR**				
6	220- Efficient Class of Estimators for Population Variance Using Two Auxiliary Variables *Cem KADILAR*, Hatice ÖNCEL ÇEKİM*				
7	259- Sliced Inverse Regression for Tobit Model Estimation *Leyla BAKACAK*, Serhat ERTUĞRUL, Semra TÜRKAN*				
8	317- A Note on Norms of Some Special Matrices *Ahmet İPEK*, Cennet ÇİMEN BOLAT*				
16.30-16.45	Coffee Break				

16.45-17.45	**Parallel Sessions VII**				
	Room 1 ENG	**Room 2 ENG**	**Room 3 TR**	**Room 4 TR**	**Room 5-Short Course**
Session Chair	***Yasin ASAR***	***Bahram Sadeghpour GİLDEH***	***Ömer ALKAN***	***Hikmet ORHAN***	***Levent ÖZBEK***
1	118-Statistical Modeling with Credit Scorecard *Tuğba TUNA** *İbrahim DEMİR*	224-How inspection errors affect the performance of conditional sampling plan *Robab AFSHARI** *Bahram Sadeghpour GİLDEH*	241-Analysis Of Alcohol Consumption Determinants in Turkey With Multinomial Probit Model *Ömer ALKAN* *İ.Yusuf YARBAŞI**	253-Effect of Sample Size on Significance Levels of the Correlation Coefficient *Hikmet ORHAN** *Zübeyde KARCI* *Emine ÇETİN TEKE*	Pi'de Rasgelelik
2	160-Linear Unified Estimator in the Zero-Inflated Poisson Regression Model *Yasin ASAR**	139-Inference for the Scaled Half-Logistic Distribution based on Ranked Set Sampling *F.Gül AKGÜL** *Birdal ŞENOĞLU*	242-Determining Of Basic Factors Affecting Successful Tobacco Cessation *Ömer ALKAN* *Ayşenur DEMİR* *Özge GENÇER**	196-Expression And Prognostic Value Of Aldehyde Dehydrogenase 1 (ALDH1) And Synuclein Gamma İn Rectal Adenocarcinoma *İsmail HARMANKAYA** *Pınar KARABAĞLI* *Güler YAVAŞ* *Zeliha Esin ÇELİK* *Özlem ATA*	
3	212- Comparison of SHEWHART, CUSUM and EWMA quality control charts in an application *Fatma KAYMAKAMTORUNLARI** *Ali Rıza FİRUZAN*	222- On Estimating the Regression Coefficients in Generalized Linear Models via a r-d Class Estimator *Fikriye KURTOĞLU** *M.Revan ÖZKALE*	263-Determining Main Factors Affecting Violence Amongst Working Women: The Case Of Erzurum City *Ömer ALKAN* *Erkan OKTAY* *F.Cansu YILMAZ**	255- Applicability of MARS Method Using Saliva Oxidative Stress Parameters in Detecting Periodontal Disease Hikmet ORHAN Emine ÇETİN TEKE Zübeyde *KARCI** *Gözde DİNÇ* *Özlem FENTOĞLU*	
4	228-Bivariate Poisson-Laguerre Polynomial Model *Hande ÜNLÜ** *Serpil AKTAŞ ALTUNAY*	169-Adjustment of the jackknifed ridge method to the linear mixed models *Özge KURAN** *M.Revan ÖZKALE*	152-The Effect of Unemployment, Divorce Rate, Internal Migration and Education Status on Crime: an assessment for Turkey *Özlem AKAY**	256-Application of MARS for Modeling the Lactation Curves *Hikmet ORHAN* *Emine ÇETİN TEKE** *Zübeyde KARCI*	
5		222-On Ridge Parameter Estimators for Generalized Linear Models: Simulation Study on Gamma Response Variable *Fikriye KURTOĞLU** *M.Revan ÖZKALE*	182-Estimation of population proportion under different ranked set sampling using air quality data *Mine TÜRKOĞLU** *Nursel KOYUNCU*	90-Value at Risk *Merve PAKER** *Hüseyin TATLIDİL*	

GALA DINNER 20:00
(Free for all days participants)
(50 TL, 15 € or 15 $ for one day participants)

26 MAY 2017 (Friday)						
08.30-17.00	**Registration**					
09.30-10.30	**Parallel Sessions VIII**					
	Room 1 ENG	**Room 2 ENG**	**Room 3 ENG**	**Room 4 ENG**	**Room 5 ENG**	
Session Chair	***Montasir Ahmed OSMAN***	***Emre KOÇAK***	***Sevgi YURT ÖNCEL***	***Aylin ALKAYA***	***Bahar YÜKSEL***	
1	53-Spatial Statistical Analysis of Infant Mortality Distribution *Montasir Ahmed OSMAN**	244-Analysis of an Online Shopping Problem *A.Reha BOTSALI** *Mehmet AKTAN*	87- Use of Support Vector Machines in Data Mining: Modeling Wind Speed *Güvenç ARSLAN* *Sevgi YURT ÖNCEL**	319- Using auxiliary information: Ratio Estimation or Poststratification *Aylin ALKAYA** *Hasan BULUT*	101-High resolution topographical point cloud data processing with R Programming *Mustafa ZEYBEK** *İsmail ŞANLIOĞLU*	
2	19- Generalized Linear Model (GZLM) Approach for Investigating Energy Concept in the Aspect of Economic Indicators *Harun YONAR** *Neslihan İYİT*	249-Efficiency Measurement of Turkish Natural Gas Distribution Companies by Using Stochastic Frontier Analysis *A.Emre EVGALLIOĞLU** *Cevriye GENCER*	276- Modeling the vehicle headway based on kernel function using different sampling scheme *Büşra SEVİNÇ** *Selma GÜRLER* *Serhan TANYEL*	173-Comparison of Nonlinear Regression Models and Least Square Support Vector Machines for Egg Production Curve Fitting *Özkan GÖRGÜLÜ* *Aslı AKILLI**	191-Usage of Interpolation Approaches on the Reduced-Dynamic Orbits of GRACE Satellites *Metehan UZ* *Aydin ÜSTÜN* *İbrahim Öztuğ BİLDİRİCİ**	
3	23-Generalized Linear Models (GZLMs) for Poisson-Gamma Distributed Response Variable *Öznur ÖZALTIN** *Neslihan İYİT*	244-Exam Scheduling Problem: A Case Study *A.Reha BOTSALI** *Arafat KOCA*	192-Effect of 3D Discrete Wavelet Transform Based Filtering on Detection of Brain Activations by GLM in Functional MRI *Güzin ÖZMEN** *Seral ÖZŞEN*	173-Fuzzy Regression Analysis Using Back Propagation Neural Network for Prediction of Sheep Live Weight *Özkan GÖRGÜLÜ* *Aslı AKILLI**	186-Frost Risk Premium Calculation Using Spatial Clustering *İsmail Gür** *Şahap Kasırga YILDIRAK* *Çiğdem LAZOĞLU*	
4	80-The statistical analysis of bus transportation for four largest cities in Turkey *Veysel ÇOBAN**	305-Comparing of Principal Component Analysis and Grey Relational Analysis in Measuring the Performance of of Turkish Non-Life Insurance Companies *M.Asım ÖZALP** *Hüseyin TATLIDİL*	315 Analysis of Non-Periodical Data *Çağlar SÖZEN** *Yüksel ÖNER* *Tolga ZAMAN* *Hasan BULUT*	114-Evaluation of the Gaussian Mixture Model and non-Gaussian Mixture Model in the Manufacturing Systems via Discrete Event Simulation *Selin SARAÇ'** *Melik KOYUNCU*	138-Spectral Properties Of A Finite System Of Sturm-Liouville Difference Operators *Esra KIR ARPAT* *Bahar YÜKSEL**	
5	80-Fuzzy based calculation for solar radiation augmentation *Veysel ÇOBAN**	271- Measuring the Efficiency of OECD Countries In Terms Of Environmental Performance *Emre KOÇAK** *Nimet YAPICI PEHLİVAN*	239-Demand Forecasting Methods in a University Campus Dining Hall *Tuba ULUSOY* *Fatma ATEŞ* *Mehmet AKTAN**	*343- A Fıeldwork Aımed At Analysıs Of Consumer Purchase Decısıon Process* *Ü. Saliha Eken İNAN** *Ö. Emrah ACAR* *A. Selçuk KÖYLÜOĞLU*		
10.30-10.45	**Coffee Break**					

10.45-11.45	**Parallel Sessions IX**				
	Room 1 **TR** **Invited Talks**	**Room 2** **ENG**	**Room 3** **TR**	**Room 4** **ENG**	**Room 5** **ENG**
Session Chair	***H. Hasan ÖRKCÜ***	***Selahattin KAÇIRANLAR***	***Hayrinisa DEMİRCİ BİÇER***	***Özlem TÜRKŞEN***	***Şule ŞAHİN***
1	39-Measuring the efficiency in the Turkish Banking Industry: Application of Data Envelopment Analysis and Malmquist Productivity Index *Volkan Soner ÖZSOY* *H. Hasan ÖRKCÜ** *Mustafa İsa DOĞAN* *Hasan BAL*	93-Two parameter weighted mixed estimator *Selahattin KAÇIRANLAR** *Nimet ÖZBAY*	181-Testing Procedures for Population Mean Based On Bootstrap under Ranked Set Sampling *Nurdan YENİAY** *Yaprak Arzu ÖZDEMİR* *Fikri GÖKPINAR*	267-An Application of Multi-Objective Optimization Approach to Saponification Process *Özlem TÜRKŞEN** *Suna ERTUNÇ*	320-Comparison of Psychometric Properties of a Measurement Tool In Terms Of Classical Test Theory and Modern Test Theory *Derya GÖKMEN ÖZTUNA** *Atilla Halil ELHAN*
2	146-Simulation study of estimating the unknown parameters in distributions using Particle Swarm Optimization *Volkan Soner ÖZSOY** *H. Hasan ÖRKCÜ* *Mustafa İsa DOĞAN* *Hasan BAL*	95-On Distribution of Bivariate Record Statistics *Gülder KEMALBAY**	288- An Actuarial Overview of Child Labor *Dilan KÖKTAŞ** *Servet KOÇAK* *Şule ŞAHİN* *Başak BULUT KARAGEYİK*	200- The analysis of different retirement decision models for defined contribution pension plans *Murat KIRKAĞAÇ** *Yasemin GENÇTÜRK*	101-Geometric shapes fitting to 3D Terrestrial laser scanner point clouds *Mustafa ZEYBEK** *İsmail ŞANLIOĞLU*
3	39-A New Two-Group Classification Method Based on Data Envelopment Analysis *Mustafa İsa DOĞAN* *H. Hasan ÖRKCÜ** *Volkan Soner ÖZSOY* *Hasan BAL*	107-The Sandwich Variance Estimators For The Parameter Estİmates Of Generalized Measurement Error Models *Rukiye DAĞALP**	206-Comparison of confidence interval methods for population coefficient of variation *Gizem KARAASLAN** *Hamza GAMGAM* *Bülent ALTUNKAYNAK*	203- MSEC Control Charts for Monitoring both Small and Large Shifts *Beste YILMAZ** *Zümre ÖZDEMİR GÜLER* *Mehmet Akif BAKIR*	320-Measurement Equivalence via Factor Analysis and Rasch Analysis *Derya GÖKMEN ÖZTUNA** *Serhat HAYME* *Atilla Halil ELHAN*
4	146-Evaluation of Dynamic Performance of Electricity Distribution Companies in Turkey using Window Analysis *Volkan Soner ÖZSOY** *H. Hasan ÖRKCÜ* *Mustafa İsa DOĞAN* *Hasan BAL*	93-Prediction Performance of the New Linear Convex Combination of the Biased Regression Estimators *Issam A DAWOUD* *Selahattin KAÇIRANLAR**	230-Effects of different parameter estimators to error rate in discriminant analysis *Hayrinisa DEMİRCİ BİÇER* Cenker BİÇER*	185- Comparison of the Pairwise Post-Hoc Comparison Tests under Heteroscedasticity *Mustafa ÇAVUŞ** *Berna YAZICI* *Ahmet SEZER*	272-Risk Classification in Agricultural Insurance under Dependency Assumption *Ezgi NEVRUZ** *Kasırga YILDIRAK*
5	39-A Hybrid Method for Multi-Group Classification Problem *Mustafa İSA DOĞAN* *H. Hasan ÖRKCÜ** *Volkan Soner ÖZSOY* *Hasan BAL*	79-The Profile Likelihood Ratio Method For Testing The Equality Of Several Log-Normal Means *Esra Güneş** *Esra GÖKPINAR* *Fikri GÖKPINAR*	277-Obtaining Point Estimates of Nonlinear Regression Model Parameters by Hybridization of Iterative and Direct Optimization Algorithms *Fikret AKGÜN** *Özlem TÜRKŞEN* *Müjgan TEZ*	239-Time Series and Artificial Neural Network Forecasting of the Electricity Demand for a Private Electricity Distribution Company *Büşra YAPICI* *Mehmet AKTAN**	273-Conditional Time of Ruin and Reinsurance *Şule ŞAHİN** *Başak BULUT KARAGEYİK*
11.45-12.00	**Coffee Break**				

12.00-13.00	**Parallel Sessions X**				
	Room 1 TR	**Room 2 TR**	**Room 3 ENG**	**Room 4 ENG**	**Room 5 ENG**
Session Chair	***H.Hüseyin GÜL***	***Hülya OLMUŞ***	***Nursel KOYUNCU***	***Nizomiddinov AHLİDİN***	***Nihal İNCE***
1	213-Proposed Nonparametric Tests For Mixed Design *H.Hüseyin GÜL** *Hülya BAYRAK*	174-Efficiency Analysis Of Manufacturing Firms In Turkey: The Application Of Malmquist Index *Başak APAYDIN AVŞAR** *Meral EBEGİL* *H. Hasan ÖRKÇÜ*	184-Shewhart mean and range control charts by using new ranked set sampling schemes *Nursel KOYUNCU** *Derya KARAGÖZ*	208- Evaluation of the Performance of the Classification Models in Data Mining *Huruy Debessay ASFHA** *Betül KAN KILIÇ*	209-Examining of a bounded influence estimator on a real life problem *Hatice ŞAMKAR** *Özlem ALPU*
2	223-A Parametric Bootstrap Approach for the Equality of Two Regression Models under Heterogeneity of Error Variances *Mehmet Enes YAZICI** *Esra GÖKPINAR* *Fikri GÖKPINAR* *Meral EBEGİL* *Yaprak Arzu ÖZDEMİR*	237-Investigating of Ability Parameter Estimation Using Bootstrap Method for 2-parameter Logistic Model *Hülya OLMUŞ** *Ezgi NAZMAN* *Semra ERBAŞ*	251-An Application of Survival Models in Motor Insurance *Uğur KARABEY** *Nihal ATA TUTKUN*	208- Outlier Tolerance of Robustified GAM Models *Huruy Debessay ASFHA** *Betül KAN KILIÇ*	235-Determining Efficiencies of Different Product Concepts Using Conjoint Analysis(CA) and Data Envelopment Analysis(DEA) *Ezgi NAZMAN** *Semra ERBAŞ* *Hülya OLMUŞ*
3	225-Performance Of Different Shrinkage Parameters In Ridge Regression According To Mean Square Errors Criteria *Büşra ÖZTÜRK** *Meral EBEGİL* *Fikri GÖKPINAR*	217-Comparison of Environmental Performance of Turkey and EU countries associated with Malmquist Index *Zülal TÜRKOĞLU TÜZÜNER** *Hasan BAL*	285-Exponential Estimators of Population Mean using Stratified Ranked Set Sampling *A.Ece DOĞRU** *Nursel KOYUNCU*	250-Assessment of Heavy Metals Analyses Using Multivariate Statistical Techniques In Relation To Drinking Water Standards: A Case Study from Turkey *Otgonbayar NAMKHAI** *Mehmet EKMEKÇİ* *Levent TEZCAN* *Hüseyin TATLIDİL* *Mustafa DEĞİRMENCİ*	202- On Several New Generalized Entropy Optimization Methods with Applications *Nihal İNCE** *Aladdin SHAMİLOV*
4	248-Rank-Based Nonparametric Tests for Ordered Alternatives with Randomized Complete Block Design *H. Kübra AKDUR* *Hasan Hüseyin GÜL** *Deniz ÖZONUR* *Hülya BAYRAK*	176- Examining the Efficiency of Health Systems of OECD Countries by Data Envelopment Analysis *Merve İHTİYAR** *H. Hasan ÖRKÇÜ*	156- A Partially Adaptive Estimator for the Censored Regression Model Based on Generalized Normal Distribution *İsmail YENİLMEZ** *Yeliz MERT KANTAR*	159-Comparison of Entropy Optimization Methods and Smoothing Splines in Estimation of Probability Density Functions *Nizomiddinov AHLİDİN** *Aladdin SHAMİLOV*	205-Fuzzy C-Means Clustering Method for Biological Data Set *Özer ÖZDEMİR* *Aslı KAYA**
5	189-An Investigation on Ratio Estimation Methods Using Ranked Set Sampling and Median Ranked Set Sampling *Merve ESEN** *Yaprak Arzu ÖZDEMİR*	195-Evaluation Of Life Satisfaction Survey By Using Integrated SEM And Fuzzy MCDM Methods *Banu GÖÇER** *Nimet YAPICI PEHLİVAN* *İlkay ALTINDAĞ*	112- A study on optimum sample size in animal breeding studies *M.Emin TEKİN**		205-Validity Index for Fuzzy Clustering *Özer ÖZDEMİR* *Aslı KAYA**
13.00-14.00	**Lunch**				

14.15-15.15	**Parallel Sessions XI**				
	Room 1 ENG	**Room 2 TR**	**Room 3 TR**	**Room 4 ENG**	**Room 5 ENG**
Session Chair	***Ömer FIRAT***	***Şeyma TORBA***	***İlkay ALTINDAĞ***	***Elif AKÇA***	***M. Moutari ABDOU BAOUA***
1	227- I-Prime Elements *Bünyamin ŞAHİN**	150-Vehicle Routing Problem with Alternative Links from the Triple Bottom Line Accounting Perspective *İlknur TÜKENMEZ** *Onur KAYA*	309-A New Approach Using Hidden Markov Model and Bayesian Method for Estimate of Word Types in Text Mining *Adem DOĞANER** *Sinan ÇALIK*	316- Extracting New Dispatching Rules for Dynamic Multi-Objective Scheduling Problems Using Simulation and GEP *Ozan BAHADIR** *Gurkan OZTURK* *Aydin TEYMOURIFAR*	323-Statistical Use In Articles Published In Veterinary Sciences *Tuba BALAK** *M.Emin TEKİN*
2	99-Gröbner-Shirshov Basis Of Special Algebraic Structure *E.Can ERDEM** *Nurten URLU* *A.Sinan ÇEVİK*	246-Evaluation Of The Logistic Performance Index By Using Multi-Criteria Decision Making Methods *Duygu TAVUŞ** *Nimet YAPICI PEHLİVAN*	309-Comparison of Performances of Latent Dirichlet Allocation and Hidden Markov Model for Open-Ended Questions Analysis *Adem DOĞANER** *Sinan ÇALIK* *Ayşe BUĞATEKİN*	294-The influence of longevity risk on pension funds: Turkish case *Bükre YILDIRIM** *A.Sevtap SELÇUK KESTEL*	119- Comparison of The Amounts of Milk Obtained From Goats By Single or Twin Births *Galip ŞİMŞEK** *Ufuk KARADAVUT* *Füsun COŞKUN* *Mercan Gamze KARAKAŞ*
3	264-Conformable Differential Transform Method for Fractional Differential Equations *Ömer FIRAT** *Ozan ÖZKAN*	36-Determining the Factors Affecting Profitability by Sectors *Fatih ÇAKMAK**	*341- Statistical Inference On CPM* *Nihan Kübra KABAKBAŞ ÖKSÜZ** *Coşkun KUŞ* *Ismail KINACI*	311- Hypothesis testing in one-way classification AR(1) model with Student's t innovations: An application to a real life data *Özgecan YILDIRIM** *Ceylan TALU YOZGATLIGİL* *Birdal ŞENOĞLU*	119-Comparison of Live-Weight Data of Turkey According to Outliers *Ufuk KARADAVUT* *Atilla TAŞKIN* *Galip ŞİMŞEK** *Mehmet Emin YAZICI* Kübra SOĞANCI
4	265-A Numerical Investigation For a Model with Functional Response *Nihal ÖZDOĞAN** *Mevlüde YAKIT ONGUN*	287-Application of Multi-Criteria Decision-Making Methods in the Selection of Cargo Firms *Özlem AKARÇAY** *Esra YAŞAR* *Ertan AKGENÇ*	201-Comparison of Service Quality of Private, Public and Participation Banks: The Case of Konya *İlkay ALTINDAĞ**	312- Investigation of Factors Causing Formation of Kidney Stones via Structural Equation Modeling *Feyza GÜNAY** *Özlem Güllü KAYMAZ* *Talha ARSLAN*	274- Computer aided architectural project evaluation *H. Derya ASLAN* *Gonca ÖZER** *Ahmet ÖZKIŞ*
5	264-Conformable Variational Iteration Method for Fractional Ordinary Differenti al Equations *Ömer FIRAT** *Ömer AÇAN*	326- Relatıonship Between Labor Participation, Education And Growth in Women in Turkey: ARDL Border Test *Zeynep KARAÇOR* *Esra KABAKLARLI* *Şeyma TORBA** *Ayşenur ŞAKALAK*	155-The Relatıonshıp between Natural Gas Consumptıon and Economıc Growth: The Example of Turkey *Burcu GÜVENEK* *Hakan ACET* *Orhan KASAP**	321-Weighted Model Selection For Time Series *Elif AKÇA** *Ceylan TALU YOZGATLIGİL*	283-Dutch Disease and Oil: A Case Study of Nigeria and Ghana *Ahmet AY* *M. Moutari ABDOU BAOUA**
15.15-15.30	**Coffee Break**				

15.30-16.30	**Parallel Sessions XII**				
	Room 1 TR	**Room 2 ENG**	**Room 3 ENG**	**Room 4 ENG**	**Room 5**
Session Chair	***Ali KURT***	***Cihangir KÖYCEĞİZ***	***Hasan GÖKBAŞ***	***Aynur KESKİN KAYMAÇI***	**Short Course Ahmet PEKGÖR**
1	303-On Conformable Double Laplace Transform *Ozan ÖZKAN** *Ali KURT*	257- Evaluation of Meteorological Parameters Homogeneity and Trends in Salihli (Turkey) *G.Elif YARBAŞI** *Meral BÜYÜKYILDIZ*	136-On The Norms Of Toeplitz and Hankel Matrices with Pell-Lucas Numbers *Hasan GÖKBAŞ** *Hasan KÖSE*	318-A New Two Decompositions of Continuous Functions *Aynur KESKİN KAYMAKÇI**	R Programında Temel İstatistik Analizler
2	106-Horadam Sedenions *Cennet ÇİMEN BOLAT** *Ahmet İPEK* *Emre ÇİMEN*	252-Homogeneity and Trend Analysis of Beyşehir Precipitation Using Non-Parametric Methods *Cihangir KÖYCEĞİZ** *Meral BÜYÜKYILDIZ*	218-Growth Series for Some Algebraic Structures *Esra KIRMIZI ÇETİNALP* Eylem GÜZEL KARPUZ* *Ahmet Sinan ÇEVİK*	318-A Type of Continuous Functions for Delta-b-open Sets *Aynur KESKİN KAYMAKÇI**	
3	214-A New Concept for Fractional Quantum Calculus: (β;q)-Calculus and Its Properties *Ali KURT** *Orkun TAŞBOZAN*	270- Trend Analyses of Konya-Karapınar Region in Turkey using Non-Parametric Methods *Ali YILDIZ** *Meral BÜYÜKYILDIZ*	219-Automaticity for Some Algebraic Structures *Eylem GÜZEL KARPUZ** *Ahmet Sinan ÇEVİK* *Esra KIRMIZI ÇETİNALP*	243-Some New Separation Axioms for Soft b-open Sets *Yunus YUMAK** *Aynur KESKİN KAYMAKÇI*	
4	333- A novel solution procedure for PDEs by Laplace Differential Transform Method *Muhibe AKYÜZ** *Ozan ÖZKAN*	270- Numerical Calculation of Flow Discharge under Sluice Gates *Ali YILDIZ** *A.İhsan MARTI*	136-On The Norms Of r-Hankel Matrices Involving Pell and Pell-Lucas Numbers *Hasan GÖKBAŞ** *Hasan KÖSE*	324-Some Properties of New One Type Zero-Divisor Graphs *Sümeyye AYKAÇ** *A.Sinan ÇEVİK* *Nihat AKGÜNEŞ*	
5	214-New Exact Solutions of Nonlinear Conformable Differential Equations Arising In Mathematical Physics *Ali KURT** *Ozan ÖZKAN*	252- Modeling of Monthly Evaporation Prediction using Artificial Intelligence Methods *Meral BÜYÜKYILDIZ* *Cihangir KÖYCEĞİZ**	296-The Szeged Estrada index of a graph *Ezgi KAYA** *A.Dilek MADEN*	340-Bi-periodic Fibonacci Matrix Polynomial *Arzu COŞKUN** *Necati TAŞKARA*	

16.45-17.45	**Parallel Sessions XII**				
	Room 1 TR	**Room 2 ENG**	**Room 3 TR**	**Room 4 TR**	**Room 5**
Session Chair	***İ.Hakkı KINALIOĞLU***	***Gülşin ARSLAN***	***Serkan AKOĞUL***	***A.İhsan MARTI***	***İ.Hakkı KINALIOĞLU***
1	40-A Test for Means of k>2 Normal Distributed Group *Neriman AKDAM* M.Fedai KAYA*	335- Determination of shear capacity of spiral columns with artificial neural network *Mustafa KOÇER* Murat ÖZTÜRK M.Hakan ARSLAN*	47-Some reliability properties of Marshall-Olkin bivariate exponential distribution *Hatice SATILMIŞOĞLU * İsmail KINACI Coşkun KUŞ*	269-ENSO Effect on Eastern Anatolia Streamflow *A.İhsan MARTI* G.Elif YARBAŞI*	Adobe Photoshop ve Illustrator
2	338-A New Discrete Distribution based on Markov dependent 0-1 Sequence with Rewards *Fatih ŞAHİN* Coşkun KUŞ İsmail KINACI*	*155-The Relatıonshıp of Energy Consumptıon and Growth in the Context of Economy of Turkey* *Zeynep KARAÇOR Burcu GÜVENEK Orhan KASAP* Esra EKİNCİ*	108- Parameter Estimation of Alt-Exp Distribution under Progressive Censoring *Adil KARAGÖZ* İsmail KINACI Coşkun KUŞ*	266-Trend Analysis of Temperature in Konya Closed Basin *Muhammed UÇAR* Meral BÜYÜKYİLDIZ S.Yurdagül KUMCU*	
3	*2-* Comparison of artificial neural network and data mining techniques for prediction of 2017 UEFA Champions League *İ.Hakkı KINALIOĞLU* Coşkun KUŞ İsmail KINACI*	314-Determination of trace metals on some wild mushroom samples encountered from Black Sea region, Turkey *Sinan AKTAŞ Neslihan İYİT İdris SARGIN Gülşin ARSLAN**	322- Discrete δ-shock model of order k *Havva ARIGÜN* İsmail KINACI Coşkun KUŞ*	269-Southern Oscillation Effect on Eastern Anatolia Precipitation *A.İhsan MARTI* Ali YILDIZ*	
4		299- Comparison of Algorithms for The Determination of the soil Thermal Diffusivity *Ahmet Sami EROL Fariz MIKAILSOY Evgeny SHEIN Gülay KARAHAN**	111-Mixture Cluster Analysis based on Mixture of Elliptical Gamma Distributions *Serkan AKOĞUL* Murat ERİŞOĞLU Ülkü ERİŞOĞLU*	269-One Dimensional Flood-Map Formation for Samsun Çarşamba River *Hümeyra BİLGE A.İhsan MARTI**	
5	*			266-CFD Analysis of Air-Water Flow Structure in a Circular Dropshaft *Muhammed UÇAR* S.Yurdagül KUMCU*	
14.00-17.00	**Konya City Tour**				

Comparison of External Egg Quality Characteristics in White and Brown Shell Eggs

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Abstract

The aim of this study is to compare the external egg quality characteristics of brown and white shell table eggs and to examine the relationship between quality characteristics. A total of 235 eggs from brown and white laying hens (Nick-chick; 95 wk of age) were used in this study. External egg quality characteristics including egg weight, egg specific gravity, shape index, shell thickness, shell weight, shell ratio, and shell strength were determined. The egg specific gravity ($P<0.05$) and shape index ($P<0.001$) values of brown eggs were higher than that of white eggs. On the contrary, no significant differences were found between white and brown eggs for egg weight, shell thickness, shell weight, shell ratio, and shell strength values. Significant ($P<0.001$) positive correlations were found between egg specific gravity and eggshell thickness ($r= 0.61$), egg weight and eggshell thickness ($r=0.64$), specific gravity and eggshell weight ($r=0.50$), specific gravity and eggshell ratio ($r=0.81$) in external egg quality of white eggs. Similarly, there were significant ($P<0.001$) positive correlations between specific gravity and eggshell thickness ($r=0.75$), specific gravity and eggshell strength ($r=0.49$), eggshell thickness and eggshell strength ($r=0.42$) in external egg quality of brown eggs. Significant ($P<0.001$) negative correlation were found between egg weight and egg shape index ($r=-0.37$) in white eggs, egg weight and specific gravity ($r=-0.35$) in brown eggs. No significant relationships were observed among others external egg quality characteristics.

Keywords: Egg, Shell color, Laying hens, External egg quality

*Presenter

Statistical and Strong Convergences in Hausdorff Topological Spaces

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Abstract

Study of summability theory in an arbitrary topological space is not always an easy issue as many of the convergence methods need linear structure in the space. The concept of statistical convergence is one of the exceptional concepts of summability theory that can be considered in a topological space. There is a strong relationship between this convergence method and strong convergence which is another interesting concept of summability theory. However, dependence of the strong convergence to the metric, studying similar relationship directly in arbitrary Hausdorff spaces is not possible. In this talk we introduce a convergence method which extends the notion of strong convergence to topological spaces. This new definition not only helps us to investigate a similar relationship in a topological space but also leads to study a new type of convergence in topological spaces. We also give a characterization of statistical convergence.

Keywords: Summability theory; topological base.

A Theoretical Approach to Construct a Subadditive Fuzzy Measure

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Abstract

Fuzzy measure theory has an important role in multicriteria decision making problems. However, identification of the fuzzy measure is a complicated process out of the exponential number of the subsets. In this talk we consider a particular set function which depends on densities of singletons with interdependence coefficients and which provides redundancy among the singletons to achieve this complexity. We obtain the Möbius representation of this function and then we present independent necessary and sufficient conditions to attain a fuzzy measure from this set function. Finally, these conditions are discussed and also supported with explanatory numerical examples.

Keywords: Möbius representation; multicriteria decision making.

Spatial Statistical Analysis of Infant Mortality Distribution

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Abstract

Infant mortality study importance comes from two sides; represents 75% of children under-five years of age mortality, in addition to the majority of these deaths can be avoided. Infant mortality combat costs huge budgets in developing and particularly Sub-Saharan African countries supported by United Nations programs to decline the current rate, which is more than five times higher compared to European countries. An accurate and realistic statistical estimate of related factors that may affect the infant mortality risk is might highly helpful to control this risk. In this paper, to estimate these factors effect in Ethiopia, a generalized linear mixed model with spatial covariance structure is adapted. This model advantage regards dealing with normal and non-normal distributed data as well as spatially autocorrelated variables. Some geographic, economic and demographic factors are used to estimate the model. The results showed the distribution is much spatially associated. Several examined variables are significantly affecting in the model, in contrast, others insignificantly impact. The results highlight the role of improving education to decrease the risk of infant mortality rate. Male and children with extra weight at birth are higher exposed, and the risk is highly different from one zone to another.

Keywords: generalized models; mixed models; Moran's I; spatial statistics.

The Effect of Home Visits by Nurses on the Physical and Psychosocial Health of the Elderly: Study Protocol for a Systematic Review and Meta-Analysis

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Abstract

The objective of this quantitative systematic review is to identify and analyz the evidence on the effectiveness of home visits by nurses on the physical and psychosocial health of the elderly. The proposed review will aim to address the following questions:1. What is the effect size of home visits regarding the physical and psychosocial health of the elderly?2. What is the effect size of the health outcomes of home visits regarding the physical and psychosocial health of the elderly according to country of residence, to the duration and frequency of the visits orto whether or not using model? Are these moderator variables? Inclusion criteria: Turkish and English studies (articles, investigation reports and dissertations) published in refereed and non-refereed journals as well as electronic journals between December, 2004 and December, 2016 with home visit attempt. Published or unpublished study resources: Master's and PhD theses. Studies with appropriate research method [randomized controlled studies, quasi-experimental studies and observational studies (cohort, case-control, cross-sectional). Studies with sufficient numeric data for analysis (Pearson's correlation coefficients, chi-square values and t-, p, sample size (N), F-values, etc. or calculability of these values. Search strategy; Turkish keywords such as meta analiz (meta-analysis), ev ziyareti (homevisits, in-homevisiting, domiciliary visits), hemşirelik (nursing),etc. and various combinations of their English equivalents were used during the search.Medline (6860 articles), Web of Sciences (1933 articles), Pubmed (1551 articles), Science Direct (1021 articles), Cinahl Plus with Full Text (1020 articles), Tubitak (98 articles), and Yök (126 articles) were searched among a total of 13.110 abstract databases. This search was completed in six months. The search was limited to the studies conducted on home visits by nurses in the last 11 years (between December, 2004 and December, 2016), conducted in Turkish and English, and conducted only with the elderly population. However, advance search will continue until the end of the study.The study titles and abstracts will be screened by two authors in the review group independently to identify eligible studies. The articles selected by two independent observers will be compared and a consensus will be made by discussing on the different ideas regarding an article. Two independent observers who have worked on research and elderly health will ensure the reliability of the coding and the coding protocol will be used. Analyses will be performed using the Comprehensive Meta-Analysis (CMA) version 3 program to apply the meta-analysis technique.

Keywords: Elderly; home visit; nursing; systematic review; meta-analysis

*Presenter

GRÖBNER-SHİRSHOV Basis of Special Algebraic Structure

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Abstract

The Gröbner-Shirshov basis theory was developed by A.I. Shirshov for Lie algebra [1] and B. Buchberger for commutative algebras [2]. This theory is a powerful tool to solve many problems; normal form, word problem, embedding theorems, ets. In this paper we obtain Gröbner-Shirshov bases for affine weyl groups [3]. Morever we find new algorithm for solving the word problem of these groups.

Keywords: Gröbner-Shirshov basis, affine weyl groups, normal form, word problem

References:

[1] A.I. Shirshov, "*Some algorithmic problems for Lie algebras*", Siberian Math. J. 3 (1962), 292- 296.
[2] B. Buchberger, "*An Algorithm for Finding a Basis for the Residue Class Ring of a Zero Dimensional Ideal*", Ph.D. Thesis, University of Innsbruck. (1965).
[3]A.S. Cevik, C. Özel,E.G. Karpuz, "*Rewriting as a Special Case of Noncommutative Gröbner Bases Theory for the Affine Weyl Group A_n*", Ring and Module Theory (2010), 73–81.

A New Compound Distribution for Overdispersed Binomial Data

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Abstract

The binomial distribution, $b(n, p)$, lacks of fitting in case of overdispersion problem in data. Unequal success probabilities cause overdispersion. As a remedy, hierarchical models or mixed binomial distributions which consider the success probability as a random variable having a suitable distribution are suggested. For example, beta-binomial distribution is commonly used in this situation. There, the success probability of the binomial distribution follows well-known beta distribution and this mixed type model acounts for the extra variation which causes overdispersion in data.

To increase flexibility, alternative distributions to the beta-binomial distribution, such as Kumaraswamy-binomial and McDonald generalized beta-binomial distributions, have been introduced in the literature.

In this work, we consider another beta-like distribution to solve the problem of overdispersion in the binomial data: the two-sided power (TSP) distribution. It is a flexible two-parameter distribution having uniform, power function and triangular as sub-distributions, and it is a reasonable alternative to beta distribution in some cases. It has the following pdf

$$g(x;\alpha,\beta)=\begin{cases}\alpha\beta^{1-\alpha}\,x^{\alpha-1} & 0<x\le\beta\\ \alpha(1-\beta)^{1-\alpha}\,(1-x)^{\alpha-1} & \beta\le x<1\end{cases}.$$

The TSP-binomial model occurs from the hierarchical relation

$$\begin{aligned}X \mid P &\sim b(n,P)\\ \mid P &\sim TSP(\alpha,\beta)\end{aligned}.$$

The unconditional pdf of X is then

$$f(x;\alpha,\beta)=\binom{n}{x}\alpha\left\{\beta^{1-\alpha}B_{\beta}(\alpha+x,n-x+1)+(1-\beta)^{1-\alpha}\right.$$
$$\left.\times\left[B(x+1,n-x+\alpha)-B_{\beta}(x+1,n-x+\alpha)\right]\right\}$$

We study its distributional properties and demonstrate its use on some real data sets. It is shown that the newly defined model is a useful candidate for overdispersed binomial data.

Keywords: two-sided power distribution; mixed binomial distribution; overdispersion; hierarchical model.

Value at Rısk

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Abstract

The risk is the potential of losing money deposited. Well, who wants to lose? Of course, no one. So, this concept is analyzing very frequently and improvements and tools for protecting is being followed continuously. Value at risk (VaR) called "new science of risk management" is a statistical technique measures the amount of potential lost that could happen in a investment or a portfolio of investments over a gıven tıme period and you do not need to be a scientist to use value at risk. This technique, which started after the 1990s and initiated a revolution in risk management, parametric and non-parametric methods are studied under the title. The wide use of VaR as a tool for risk assessment, especially in financial service firms and the extensive literature that has developed around it, pushes us to investigate this issue.

Key words: Value at risk (VaR), Variance-Covariance approach, Historical simulation, Monte Carlo simulation

Joint Reliability Importance in m-consecutive-k,l-out-of-n:F Systems

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Abstract

The Joint Reliability Importance (JRI) of two components is a measure of the interaction of two components in a system for their contribution to the system reliability. This paper focuses on the JRI of components in generalized version of m-consecutive-k-out-of-n:F system that is named as m-consecutive-k,l-out-of-n:F system. This system consists of n linearly (circularly) ordered components such that fails if and only if there are at least m l-overlapping runs of k consecutive failed components $(n \geq m(k-l)+l, l<k)$. We derive the closed-form formulas in linear m-consecutive-k,l-out-of-n:F system when the components are s-independent & identical. Our numerical examples demonstrate the use of derived formulas.

Keywords: reliability complements and substitutes; combinatorial method; system reliability.

Prediction Performance of the New Linear Convex Combination of the Biased Regression Estimators

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Abstract

The prediction of a regression model can be adversely affected by multicollinearity. Although biased estimation procedures have been proposed as an alternative to least squares, there has been little analysis of the predictive performance of the resulting equations. Therefore, we introduce two linear convex combination estimators to examine the predictive performance of them. Also, the theoretical results are illustrated by a numerical example and a region is established where the proposed estimators are uniformly superior to the other estimators

Key Words: Ridge Estimator; Liu Estimator; Linear Convex Combination Estimators; Prediction Mean Square Error

Two Parameter Weighted Mixed Estimator

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Abstract

In this paper, we introduce a new two-parameter weighted mixed estimator by unifying the weighted mixed estimator (Schaffrin and Toutenburg, 1990) and the two-parameter estimator of Özkale and Kaçıranlar (2007). This new estimator is a general estimator which includes the weighted mixed estimator, the two-parameter estimator and the restricted two-parameter estimator as special cases. Furthermore, the performances of the new estimator against the weighted mixed estimator and the two-parameter estimator are examined in the mean squared error matrix sense. Finally, a numerical example and a Monte Carlo simulation are given to illustrate some of the theoretical results.

Keywords: mean squared error; two-parameter estimator; two-parameter weighted mixed estimator; weighted mixed estimator.

The Relatıonshıp between Natural Gas Consumptıon and Economıc Growth: The Example of Turkey

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Abstract

Natural gas, one of the renewable energy resources, has an important share in world energy consumption due to its ease of storage and transmission, low costs, and the most importantly, environmental friendliness. The parallel increase of GDP value of Turkey along with demand for natural gas in recent years especially demonstrates the importance of this energy resource from the point of view of our country. However, this consumption which is based on import requires the consideration of the critical effect on economic growth. In this study the relationship between natural gas consumption and economic growth was examined by using the data of Turkish economy from the period of 1980-2015. The present study was conducted with the help of Johansen Cointegration Test and Granger Causality Test. Obtained results have demonstrated the existence of long-term relationship between the variables.

Keywords: Natural Gas Consumption, Economic Growth, Johansen Cointegration Test, Granger Causality Test

Dutch Disease and Oil: A Case Study of Nigeria and Ghana

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Abstract

The purpose of this paper is to analyze the effects caused by the relationship between natural resource (especially the crude oil) exploitation and decline of the agriculture or manufacturing industry in Nigeria and Ghana by using graphics and statistical data. The phenomenon that links exploitation of natural resources and decline of domestic manufacturing is called "Dutch disease". In order to understand the degree of influence of this Dutch disease, we analyzed the behavior of exports of goods, oil exportations, the exchange rates, and agricultural and manufacturing sectors of both countries using graphs. We found curse of natural resources case in Nigeria which is due to the oil dependence in its economy. The effect of Dutch disease in Ghana was huge in 2011 but this effect decreased in 2013 due to the decline of oil exportation or oil dependence in the economy. Increases in oil revenue led to an appreciation of Ghanaian Cedi (GH₵). Policies must be made in both Nigeria and Ghana to successfully support the exploitation of their oil while simultaneously boosting other sectors of their economies as well.

Keywords: Dutch disease; oil boom; Nigeria; Ghana; curse of natural resources,

*Presenter

Some New Type of Summability Methods Defined Via Bochner Integral for Random Elements

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Abstract

In this talk we define a new type of uniform integrability for sequences of Banach valued measurable functions (random elements) by using Bochner integral so that we generalize the concept of A-compactly uniform integrability. Moreover, we study the concepts of A-strong convergence and A-statistical convergence for sequences of random elements and we obtain some relationships among these concepts.

Keywords: A-statistical convergence; A-compactly uniform integrability; Banach spaces.

On A New Class of Multivalued Weakly Picard Operators

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Abstract

In this talk, by introducing a new and different class of multivalued mappings in metric spaces, we give some multivalued weakly Picard operators in complete metric spaces. Our results extend and generalize many fixed point theorems and they are based on a new approach of contraction mapping, which is called F-contraction.

Keywords: Fixed point, weakly Picard operators, F-contractions

Estimation of the Stress-Strength Reliability of the Standard Two-Sided Power Distribution

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Abstract

When a component is exposed to a random stress Y, the reliability of the system is defined as $R = P(Y < X)$, where X is the strength of the component. Estimation of R under various parametric models has been studied extensively in the literature. In this work, we consider the standard two-sided power (STSP) distribution which is a generalization of the triangular distribution with the pdf

$$f(x|\alpha,\beta) = \begin{cases} \alpha\left(\frac{x}{\beta}\right)^{\alpha-1} & , \quad 0 < x \leq \beta \\ \alpha\left(\frac{1-x}{1-\beta}\right)^{\alpha-1} & , \quad \beta \leq x < 1 \end{cases}$$

where $\alpha > 0$ is the shape parameter and β is the reflection parameter. The STSP distribution is more flexible than both of the triangular and power function distributions and has a bathtube shaped hazard curve. In this study, we assume that the stress Y and the strength X follow independent standard two sided power distributions and estimate the reliability R with different estimating methods. Then we compare the performences of the estimators by using a simulation study.

Keywords: System reliability, Standard two sided-power distribution, Stress-strength model.

*Presenter

Confidence Interval Based On Robust Estimators for the Difference of Two Independent Nonnormal Population Variances

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Abstract

In random experiments, most analyses are based on interpretation of the difference between the means of experiment and control groups. However, studying the difference between the variances of the experiment and control groups may also be useful in interpreting the analysis results. It is known that sample variance estimator S^2 does not display robust statistic features in the estimation of nonnormal population variance. Therefore, the coverage probabilities of the confidence intervals obtained with this estimator have much lower values compared to the nominal confidence interval. In such cases, it is necessary to use robust scale estimators for estimation of population variance. This study focuses on interval estimation with sample variance estimators based on Winsorized Mean and Trimmed Mean for the difference of the variances of two nonnormal populations. In this study, the data produced from Gamma, Chi-square, Weibull, Lognormal, Beta, Student-t, Laplace and Uniform distributions with different parameters was used with the program written in Matlab R2009a. Simulation studies were conducted based on 10000 replications with the sample sizes $n = 10, 20, 50$ and replacement/trimming proportions $\rho = 5, 10$. Firstly, Shapiro-Wilk Goodness of Fit test was used to determine whether the distribution of this estimators complied with normal distribution. While replacement/trimming was made only on the high end of the consecutive data in operations conducted with sample data generated positively skewed distributions; replacement/trimming was made on both ends in the sample data generated from symmetric distributions. Secondly, the confidence intervals based on these estimators for the difference of the variances of two nonnormal distributed populations were compared in terms of coverage probabilities and average length widths. From the results in this study, it is understood that the distribution of this estimators complies with the normal distribution since $p - value > \alpha$ for $\alpha = 0.05$ with the sample sizes $n = 10, 20, 50$. According to simulation study, it was determined that the coverage probabilities of confidence intervals obtained with estimators based on both Winsorized and Trimmed means were very close to the nominal confidence level in any case. However, it was seen that the average length widths of confidence intervals obtained with sample variance estimator based on Trimmed Mean were narrower compared to the average length widths of confidence intervals obtained with sample variance estimator based on Winsorized Mean. According to these results, it will be appropriate to prefer interval estimations obtained with sample variances estimator based on Trimmed Mean since it provides narrower confidence interval for the difference of the variances of two nonnormal populations.

Keywords: Winsorized mean; trimmed mean; interval estimation; coverage probability.

Comparison of Artificial Neural Network and Multiple Linear Regression Models for the Prediction of Body Mass Index

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Abstract

Body Mass Index (BMI) is a simple measurement that uses a weight-to-height ratio and is used to classify adults who are underweight, overweight or obese. A higher BMI is determined to be frequently associated with the increased risk of cardiovascular hearth disease (CHD) and type 2 diabetes. Metabolic syndrome is defined as a complex disorder caused by a cluster of various conditions, which increase the possibility of CHD and type 2 diabetes and it is diagnosed according to the NCEP ATP III Identification. On the other hand, most patients with metabolic syndrome are obese or overweight. The aim of this study is to investigate if the people who have metabolic syndrome components and risk factors are expected to be obese. Therefore, the goal is to estimate a biologically reasonable model to predict BMI with metabolic syndrome components and risk factors. Because the risk of metabolic syndrome can be reduced by controlling these modifiable components and risk factors with various lifestyle changes (smoking cessation, healthy nutrition, physical activity, etc.), obesity can thus be prevented. Since there is linear relationship between BMI and the regressor variables, Multiple Linear Regression was considered. Multiple Linear Regression (MLR) and Artificial Neural Network (ANN) models were used to model BMI. Stepwise regression methods (forward selection, backward elimination and stepwise regression) were compared to find the best subset of variables in the first stage of the analysis. MSE, adjusted R^2, Mallows's C_p and PRESS statistics were used as the selection criteria. The data has been obtained from the 321 participants aged more than 20 years who were consecutively invited for health check-up examination at the Internal Medicine Department of Near East University Hospital. In the obtained model, based on the aforementioned criteria, variables that were found to be significant in the 13 variables are; waist circumference, triglyceride, fasting glucose, HDL, gender, smoking, systolic and diastolic blood pressures. It should be mentioned that these obtained variables are completely compatible with the metabolic syndrome components (NCEP ATP III Identification) and risk factors. The performance of these estimation models (MLR, ANN) were compared using Root Mean Square Error, Mean Absolute Prediction Error and R^2. It is clearly seen that the developed models are capable of predicting BMI. The comparison result indicates that ANN model is more feasible than MLR in predicting BMI. As a result of the model, it is suggested that obesity can be prevented by controlling these components by controlling the changeable metabolic syndrome components and risk factors and reducing the risk of metabolic syndrome with various lifestyle changes.

Key words: Body Mass Index; Multiple Linear Regression; Artificial Neural Network.

Horadam Sedenions

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Abstract

The sedenions form a 16-dimensional non-associative and non-commutative algebra over the set of real numbers. The main object of this paper is to present a systematic investigation of new classes of sedenion numbers associated with the familiar Horadam numbers. In this study, we investigate Horadam sequence as generalization of linear recurrence equations of order two. The various results obtained here for these classes of sedenion numbers include recurrence relations, summation formulas, Binet's formulas and generating functions.

Keywords: Sedenion numbers; Horadam numbers.

A Study on Optimum Sample Size in Animal Breeding Studies

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Abstract

Objectives: This research was carried out with the approach of an optimum sample size in animal husbandry surveys. It has been emphasized that decisions based on excessive sample size may be wrong.

Material and methods: In the study, the growth data of 37201 kid goats were used. By random sampling of the raw data, different groups with various sample sizes were established. Effects of the gender and two different dam ages on growth rate of the kid goats were compared by using 2 independent samples t tests. Mean values, standard deviations, common standard deviations, the difference between means (effect size, d), standardized effect size (SES), and P values were calculated.

Results: For effect size of the gender factor, the mean value of all of the sample sizes was found as 0.42 that was intermediate level. But the mean value was found as 0.09 for dam age factor, which was at low level. Significance values (P) of the gender factor only for n=30 and n=10 were P>0.05, whereas for larger sizes was P<0.05 and statistically significant. The P value calculated for the dam age comparisons was statistically significant (P<0.05) only for the groups with largest subjects (n=8246), however it was not significant (P>0.05) for other sample sizes. The dam age factor, which has a low effect size and practically not effective, has been found to be steeply effective in large sample sizes.

Conclusion: As a result, although the factors with small effect size were found to be statistically effective when the groups have large sample sizes, the results were practically meaningless. Therefore, because the mean values and standard deviation does not change in the groups with n=100 and larger, the optimum sample size maybe between 30-100 object numbers for the factors with low and medium effect sizes. It was reliable to limit the optimum sample size of the groups between 400 and 500, even if the possibility of increasing the number of samples in the studies that made comparison of averages.

Key words: Sample size, effect size, goat, growth

*Presenter

A Probabilistic Approach to Stock Exchanges Using Variable Length Markov Chains

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Abstract

Estimation of stationary variable length Markov chains (VLMCs) on a finite space was studied. VLMCs are Markov chains that their memories depend on a variable number of lagged values. The variable-length markov chain (VLMC) is structurally larger and richer than the higher- order Markov chain models. They build a very flexible class of tree-structured models for categorical time series. In this study, indexes of FTSE, SP500, Nasdaq and Nikkei-225 stock exchanges were able to modeled with VLMC. According to the results of VLMC, the differences of the indexes are presented by a probabilistic approach.

Keywords: VLMC, Stock Exchange, probabilistic approach

Portfolio Selection Using Stepwise Regression

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Abstract

Since the development of Modern Portfolio theory, many techniques have been developed for portfolio selection. For the portfolio selection, the variance-covariance matrix needs to be calculated. In this study, we focused on the problem of selecting a portfolio by using stepwise regression without the need of the variance-covariance matrix. The stock certificate traded on the BIST-30 index were used as the application. It was then investigated whether the selected stock certificates could be used to predict the BIST-30 index

Keywords: Stepwise Regression, Portfolio Selection

Generalized Linear Models (GZLMs) for Poisson-Gamma Distributed Response Variable

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Abstract

Generalized linear models (GZLMs) include a wide range of statistical models such as multiple linear regression model, logistic regression model, Poisson regression model, and etc. GZLMs relate explanatory variables with response variable coming from exponential family. This family contains many common continuous and discrete distributions such as normal distribution, gamma distribution, binomial distribution, Inverse Gaussian distribution, Poisson distribution, and etc. In this study, we will focus on GZLMs for Poisson-gamma distributed response variable. Also GZLMs allow us to use link functions such as identity, log, power, inverse, and etc. In this study, we will investigate the effect of sugar consumption on health for United States by using GZLMs.

Keywords: Generalized linear models; exponential family; Poisson-gamma distribution; link function.

Extracting New Dispatching Rules for Dynamic Multi-Objective Scheduling Problems Using Simulation and GEP

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Abstract

In this paper, simulation and Gene Expression Programming (GEP) are used to evolve new dispatching rules for the dynamic multi-objective flexible job shop scheduling problems. The applied GEP that defines dispatching rules as expression trees has linear structure, which makes it more understandable than the other evolutionary methods like GP (genetic programming). New approach is used for design of the GEP terminal and function sets, which improves rules performances. In addition to the job and shop floor features, the terminal set contains operational based and mostly modified characteristics, which are combined based on the operators of the function set. These features represent dynamism of the scheduling environments properly and also special design of the function set provides both of the linear and non-linear combination of the features. Comparison that is done in a well-known environment of the literature, shows that the extracted composite rules generally have better results than the classic and the other dispatching rules selected from the literature. The rules are robust, which can be used in all similar dynamic multi-objective environments. With some modifications, the proposed method can also be applied for extracting new special rules for the other scheduling problems.

Keywords: Multi-objective scheduling, Dispatching rules, Gene expression programming, Optimization

Comparison of Live-Weight Data of Turkey According to Outliers

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Abstract

Outliers are observation or measures data that are suspicious. Because they are very smaller or bigger than other data. Evaluation of numerical data obtained after comprehensive scientific work often reveals that one or more of the observations are away from the others. They caused seriously deviations. We aimed to determine outliers of data in this study. This study was carried out Agricultural Faculty, Ahi Evran University in Kırşehir. Turkeys were used as material. They has been grown until the age of 15 weeks. Measurements were taken regularly as weekly. Cook's distance and *DFFITS* criteria has been used determine the outliers of the live weight. As a result, *DFFITS* method is more efficiency than *COOK*'s distance to find outlier values.

Keywords: Turkey, Live weight, Outlier, Cook distance, *DFFITS*

Parameter Estimation of Generalized Rayleigh Distribution Based On Ranked Set Sample

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Abstract

Recently, number of researchers focused on modified Ranked Set Sampling (RSS) methods and parameter estimation on RSS. It is an efficient method for estimating parameters when exact measurement of observation is difficult and/or expensive. In this study, we deal with the estimation of the shape and scale parameters for generalized Rayleigh distribution by using maximum likelihood estimation method based on RSS and its some modifications. Also, we compared the biases, mean squared errors and relative efficiencies of estimators in simple random sampling, RSS, extreme RSS and median RSS with different set and cycle sizes. A Monte Carlo simulation study is performed by using Mathematica 11.0 with 10,000 repetitions.

Keywords: modified RSS methods**;** mean squared error; parameter estimation; maximum likelihood estimator.

An Exploratory Data Analysis of Municipal Waste Treatment Types

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Abstract

The municipal waste treatment is an important subject for governments as well as local authorities. Many local authorities discovered that the recycling waste might create a revenue for local managements. Also environmental problems created by waste treatment types also get attention nowadays from media and the people living in the area. There are 4 different municipal waste treatment types at the moment according to European Union statistics. In this study some exploratory data analysis of municipal waste treatment types is shown. The emphasis on this study will be given to visualization of waste treatment types among some European countries. In order to visualize the data Tableau software is used. Some inferences from the exploratory data analysis is given in detail.

Keywords: Exploratory data analysis, Spatial Data, Visualization, Tableau

*Presenter

A Hybrid Forecasting Method Based On Exponential Smoothing and Multiplicative Neuron Model Artificial Neural Network

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Abstract

Holt exponential smoothing method is an effective method for forecasting of non-seasonal time series. In Holt method, moving average operator with exponential decay weights is used. Multiplicative neuron model artificial neural network is a non-linear time series forecasting method. In this study, two methods are hybridized by using particle swarm optimization. Parameters and combination weights for Holt method and multiplicative neuron model are determined by particle swarm optimization. The final forecasts and confidence intervals for forecasts are obtained by using random subsampling bootstrap approach. Moreover, hypothesis tests for combination weights are applied by using bootstrap samples. The proposed method is applied for stock exchange data sets and a simulation study is set to investigate the forecasting performance of proposed method.

Keywords: Holt method, multiplicative neuron model artificial neural network, particle swarm optimization, stock exchange data sets.

A New Intuitionistic Time Series Fuzzy Inference System

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Abstract

In the time series prediction literature, although adaptive network fuzzy inference system and fuzzy functions approach can be utilized as a prediction tool, they have been not designed for prediction problem and they ignore the dependency structure of time series observations. From this point of view, making a design of the method that considers the dependency structure of observations will provide to get more accurate prediction. In this study, an intuitionistic time series fuzzy inference system (I-TSFIS) has been proposed. In the proposed method, in just the same way as in the intuitionistic fuzzy inference systems, not only the membership values and crisp observations, but also the non-membership values are used as inputs of the system in the prediction process. Moreover, under favour of using the crisp values as targets and outputs of the system, the defuzzification of outputs is not needed and so it is expected that the model error will be reduced. The proposed I-TSFIS based on a non-linear function of crisp observations, membership and non-membership values and this function is represented by Sigma-Pi neural network (SP-NN) in other words the non-linear relationships between inputs and outputs of the proposed I-TSFIS are determined by SP-NN. The obtaining of optimal weights of SP-NN is performed by modified particle swarm optimization. And also I-TSFIS uses intuitionistic fuzzy C-means to obtain fuzzy clusters, membership and non-membership values of observations for these clusters. To evaluate the prediction performance of the proposed I-TSFIS, various real-life time series data have been analyzed by using some prediction tools and the results interpreted together approve that the proposed I-TSFIS has superior prediction ability.

Keywords: Fuzzy Inference System, Intuitionistic Fuzzy C-Means, Sigma-Pi Neural Network, Time Series Prediction

*Presenter

A Robust Learning Algorithm for Pi-Sigma Artificial Neural Networks Based on M-Estimator

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Abstract

Time series forecasting problem can be solved by using artificial neural networks (ANN). Pi-sigma ANNs are high order and multilayer feed forward artificial neural network and they have been used for forecasting problem in the literature. Pi-Sigma ANN is suffered from outliers in the learning sample due to especially multiplicative neuron model in its structure. In this study, a new learning algorithm is proposed for training of Pi-Sigma ANN. The proposed algorithm is based on particle swarm optimization. In the learning algorithm, objective function is same as the error function in Huber M-estimator. The proposed learning algorithm is a robust algorithm and its performance is compared with some robust approaches. At the end of analysis, it is obtained that the proposed method is outperform for some data sates.

Keywords: Pi-Sigma artificial neural network, particle swarm optimization, outlier, robust learning algorithm.

*Presenter

Bagging Fuzzy Ridge Regression Functions Approach for Forecasting

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Abstract

Fuzzy theory based forecasting methods have been commonly used recent years. Fuzzy regression functions methods can produce accurate forecasts. In the fuzzy regression functions approaches, the multicollinearity problem is occurred. This problem was solved by using ridge regression method to obtain fuzzy functions in Bas at al. (2015). In this paper, Bas et al. (2015)'s fuzzy ridge regression functions method is modified by using subsampling bootstrap method. The forecasts of the proposed method are bootstrap aggregated results of the bootstrap samplings of forecasts. In the proposed method, fuzzy c-means is used as fuzzification method. The proposed approach is compared with type-1 fuzzy regression functions method, ANFIS and classical time series methods. At the end of applications, it is obtained that proposed method is outperforms than others.

Keywords: Forecasting, subsampling bootstrap, fuzzy functions approach, fuzzy c-means, type-1 fuzzy sets.

IID Bootstrap Approach with Rejection Sampling for Pi-Sigma Artificial Neural Network

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Abstract

Pi-Sigma artificial neural network (ANN) is one of the popular ANN types which are used for forecasting problem in the literature. Although the satisfactory forecast results can be obtained from Pi-Sigma ANN, the forecasting results will change sample by sample of time series. In the light of this fact, the forecast should be obtained as central tendency measure of forecast distributions which are obtained from random samples of time series. When the samples of time series are randomly selected from history of the data set, the forecasts of Pi-Sigma ANN will be randomly changed and they will come from an unknown random distribution for forecasts. A practical method for the estimation of this distribution is usage of a bootstrap approach. The selected bootstrap approach should regard dependent structure of time series and initial condition dependency of pi-sigma ANN. Independent identically distributed Bootstrap approach with rejection sampling (IID-BRJ) can be preferred as a suitable bootstrap approach for this problem. In this study, a new forecasting algorithm is proposed based on IID-BRJ for Pi-Sigma ANN. The training of Pi-Sigma is performed by particle swarm optimization. In the new algorithm, forecasts and confidence intervals of forecasts are obtained from bootstrap distributions. The performance of the proposed method is investigated by using real world time series data sets.

Keywords: Bootstrap approaches, Pi-Sigma artificial neural network, particle swarm optimization, forecasting.

*Presenter

Spectral Properties of a Finite System of Sturm-Liouville Difference Operators

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Abstract

Let L denote the difference operator generated in $l_2(N, \mathbb{C}^l)$ by the system of the difference expressions

$$(\Lambda^{(j)} y^{(j)})_n := a_{n-1}^{(j)} y_{(n-1)}^{(j)} + q_n^{(j)} y_n^{(j)} + a_n^{(j)} y_{n+1}^{(j)}, n \in N = \{0,1,\dots\}\, j = 1,\dots,l$$

where $a_n^{(j)}{}_{n\in N}$ and $q_n^{(j)}{}_{n\in N}$ are complex sequences.

In this work, using the method of variation of parameters Green Function of the operator is found and resolvent operator is defined. We also obtain the point spectrum and the set of spectral singularities. Using the uniqueness theorems of analytic functions, structure of eigenvalues and spectral singularities are investigated. There are at most a finite number of eigenvalues, and at most a finite number of spectral singularities.

Our aim is to finish the preparation of the spectral expansion.

Keywords: Difference operators; resolvent operator; eigenvalue; spectral singularity.

*Presenter

Inference for the Scaled Half-Logistic Distribution based on Ranked Set Sampling

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Abstract

In this study, we consider the estimation of the scale parameter of scaled half-logistic (SHL) distribution. In the estimation procedure, we consider different estimation methods, namely, maximum likelihood (ML), method of moment (MM) and modified maximum likelihood (MML) proposed by Tiku (1967, 1968). Also, two different sampling methods are used to generate the random sample from SHL distribution. The first one is traditional simple random sampling (SRS) and the other one is its plausible and efficient alternative ranked set sampling (RSS). See McIntyre (1952) and Chen et al. (2004) in the context of RSS. The performances of the proposed estimators are compared via Monte-Carlo simulation study with respect to bias, mean square error and relative efficiency criteria. We also investigate the performances of the proposed estimators and sampling methods under imperfect ranking to determine the most efficient estimator and the most efficient sampling method in case of errors in ranking.

Keywords: Scaled half-logistic distribution, ranked set sampling, efficiency, imperfect ranking.

Different Estimation Methods for the Parameters of Inverse Weibull Distribution: An Application to Fatigue Lifetime Data

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Abstract

Keller and Kamath (1982) introduced the inverse Weibull (distribution) as a suitable model to describe the degeneration phenomena of mechanical components. From that time, it is applied so many areas such as survival analysis (Erto and Rapone, 1984), earthquake (Pasari and Dikshit, 2013), and wind speed (Akgül et al., 2016).

In this study, we consider the estimation of the unknown parameters of IW distribution by using eight different methods: maximum likelihood (ML), least squares (LS), weighted least squares (WLS), percentile (PC), maximum product of spacings (MPS), probability weighted moments (PWM), Cramér-von Mises (CM) and Anderson-Darling (AD). The performances of the estimators are compared via an extensive Monte-Carlo simulation study with respect to bias, mean square error (MSE) and deficiency criteria. The simulation results showed that the ML and the MPS estimators demonstrate the best performances among the others. At the end of the study, an application is given to demonstrate the implementation of IW distribution for fatigue lifetime data.

Keywords: Inverse Weibull distribution, estimation methods, efficiency, Monte-Carlo simulation.

Renewable Energy Optimization Model for Economic External Balance

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Abstract

In this paper, an optimization model (OM) which approaches Renewable Energy (RE) and current deficit parameters together and investment plans are ascertained for economies which have been through current deficit issue originated from power generation. Originality of the paper is stemmed from the OM model that ascertains investments strategy via using economic external balance and renewable energy together. The optimization model is devised without affecting the current external economic balance and based on parameters such as profit transfers for foreign direct investments (FDI), interest payments for domestic investments, import rates for RE systems, power generation values of RE systems, electricity demand projection in the future and import source rates in power generation. In this framework of constraints of the model, effects of RE investments in 12 year period on domestic and external economic balance is elaborated. The implication of Turkey application of the model is that RE investments are a significant opportunity for external balance maintenance. An optimization model is ascertained which can be a reference for economies struggle with energy induced current deficit issue.

Keywords: Current Deficit; Optimization Model; Renewable Energy

Linear Optimization Model Based On Analytic Hierarchy Process: Factory Location Study

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Abstract

Analytic Hierarchy Process (AHP) is a multipurpose decision making process that contains more than one criteria, makes selection sequencing among more than one alternatives. This study that is prepared in the framework of AHP method is enforced at two stages. At the first stage, selection sequencing of alternatives are established via AHP. At the second stage linear optimization model is performed that model constraints are constituted from AHP data and purposes an alternative which is not on the first sequence to be on the first sequence. After the application a solution model is formed that provides an alternative to be on the first sequence in AHP decision at minimum level illustrating how much improvement is needed in significance levels within selection criteria. Originality of the paper is stemmed from the method which provides quantitative information about improvement of existing situation and heads towards decision maker from alternative uniting the quantitative method with AHP with linear optimization model that heads from decision maker to alternative. For instance, the model presents information that how much percent improvement is necessary for an alternative which is on the third sequence to be on the first sequence. The application linear optimization model obtained from AHP is solved by GAMS (General Algebraic Modeling System) and necessary optimum conditions are determined for an alternative which is not on the first sequence to be on the first sequence. Application areas of this new model that unites linear optimization model and AHP are analyses that ascertain designation strategies among alternatives such as regions willing to be investor preference, brands willing to be customer preference, employees willing to be employer preference.

Keywords: AHP; Linear Optimization Model; Multipurpose Decision Making Techniques

Robust Mixture Regression Modelling Based On the Generalized M (GM)-Estimation Method

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Abstract

Bai (2010) and Bai et al. (2012) proposed robust mixture regression method based on the M regression estimation method. However, the M-estimators are robust against the outliers in response variables, but they are not robust against the outliers in explanatory variables (leverage points). In this paper, we propose a robust mixture regression procedure based on the GM regression estimation method to handle the outliers and the leverage points, simultaneously. We give an EM type algorithm to compute estimates for the parameters of interest. We provide a simulation study and a real data example to assess the robustness performance of the proposed method against the outliers and the leverage points.

Keywords: EM algorithm; GM-estimation method; M-estimation method; mixture regression models; robust regression.

Principal Functions of Matrix Sturm-Liouville Operators

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Abstract

Some problems of spectral theory of differential and some other types of operators with spectral singularities were studied by many authors. All the paper works related with differential and difference operators are of scalar coefficients. In a recent series of papers spectral analysis of the differential and difference equations with matrix coefficients has been studied by the works shown in below. In this paper, with respect to the spectral properties, we determine the properties of the principal functions corresponding to the eigenvalues and the spectral singularities of the boundary value problem (BVP)

$$-y''+Q(x)y=\lambda^2 y,\ \ x\in\mathbb{R}_+=[0,\infty]$$
$$\left(\alpha_0+\alpha_1\lambda+\alpha_2\lambda^2\right)y'(0)-\left(\beta_0+\beta_1\lambda+\beta_2\lambda^2\right)y(0)=0,$$

where Q is a non-selfadjoint matrix-valued function (i.e. $Q\neq Q^*$), α_i and β_i are non-selfadjoint matrices. Also α_2,β_2 are invertible.

Keywords: Eigenvalues, Jost solution, non-selfadjoint differential operator.

On The Norms of Toeplitz and Hankel Matrices with Pell-Lucas Numbers

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Abstract

Let us define $A = \left[a_{ij}\right]_{i,j=0}^{n-1}$ and $B = \left[b_{ij}\right]_{i,j=0}^{n-1}$ as $n \times n$ Toeplitz and Hankel matrices, respectively, such that $a_{ij} = Q_{i-j}$ and $b_{ij} = Q_{i+j}$ where Q denotes the Pell-Lucas number. We found upper and lower bounds for the spectral norm of these matrices.

We derive expressions of spectral norms for Toeplitz and Hankel matrices, involving Pell-Lucas numbers.

Keywords: Pell-Lucas Number, Toeplitz Matrix, Hankel Matrix, Spectral Norm.

SELÇUK ÜNİVERSİTESİ

Measuring the efficiency in the Turkish Banking Industry: Application of Data Envelopment Analysis and Malmquist Productivity Index

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Abstract

The objective of this study was to measure the total factor productivity and the changes in components of the total factor productivity generated by the banks in Turkish Banking Sector during the period of 2008-2013. Non-parametric approaches, namely the Data Envelopment Analysis and the Malmquist index are employed to calculate technical efficiency and productivity. Within the context of performance measurement, we use input and output variables to test technical efficiency index, and to test a change in total factor productivity index. The growing competition in Turkish Banking Sector forces banks to attach more importance to productivity factor for sustainable growth purposes. The results further indicate that Turkish Banking Sector seem to have experienced a significant productivity growth over the sample period.

Keywords: Banking sector; Efficiency; Data envelopment analysis; Malmquist productivity index.

A New Two-Group Classification Method Based on Data Envelopment Analysis

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Abstract

Classification problems are popular problems which are often encountered in data mining, statistics, economy and industry. In this study, a new classification model has been introduced which can be used to solve of two group classification problems. The proposed new model for two groups of classification model is mixed of the Pendharkar and Troutt (2014) model that bases on the Data Envelopment Analysis BCC model and the two-stage classification model proposed by Sueyoshi (2004). The proposed new approach is detailed examined on an example taken by Pendharkar and Troutt (2014) and also, it is observed that the classification performance of proposed method is better than the other two methods from the simulation study.

Keywords: Classification; two-group case; Data envelopment analysis; BCC model.

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A Hybrid Method for Multi-Group Classification Problem

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Abstract

Although a great number of mathematical programming models for two-group classification problems have been proposed in the literature, there are few mathematical programming models for multi-group classification problems. The proposed multi-group classification model in this study is a new classification model that based on mathematical programming and radial basis neural networks. In the mathematical programming classification models literature, values in the data set must be positive. In the first stage of this new approach, negative data moves to positive space with the help of radial basis neural networks and classification score for each unit, in a similar manner Satapaty et al. (2009), is estimated with the help of a linear regression equation. In the second stage, in a similar manner Lam and Moy (1996), classification of units is made by mathematical programming model that threshold test. The simulation study showed that the new approach performed better than many other multi-group classification methods in the negative data case.

Keywords: Classification; multi-group case; radial basis neural network; mathematical programming.

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Simulation Study of Estimating the Unknown Parameters in Distributions Using Particle Swarm Optimization

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Abstract

One of the most important steps in the modelling process is the estimation of unknown parameters. In general, this is achieved by solving an optimization problem that relates the objective function to the response variable and the functional part of the model containing the unknown parameters in such a way as to produce parameter estimates. Unknown parameters, when loosely speaking, are treated as variables to be solved for optimization and the data are used as known coefficients of the target function at this stage of the modelling process. There are many distributions in the literature. It is very important to estimate the parameters of these distributions. The classical estimation methods, such as maximum likelihood and least squares, are often used to estimate the parameters of distributions. In many cases this method uses iterative processes, which require the adoption of initial values. Therefore, particular methods will also be presented, which obtain estimates close to the real values of the parameters. In this paper, we propose a new method to solve this problem by using these distributions as maximizing the likelihood function of some distributions is a quite difficult problem.

Keywords: Parameter estimation; Likelihood function; Particle Swarm Optimization.

Evaluation of Dynamic Performance of Electricity Distribution Companies in Turkey using Window Analysis

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Abstract

In the face of increased energy demand, efficient use of energy is a very important issue. The authorities of our country organize events such as a week of energy productivity to raise awareness on this issue. In this study, the performances of electricity distribution companies, which are mostly private companies in our country, are evaluated. In order to better evaluate the inputs and outputs used in these companies, it is necessary to consider the changes depending on the time. The trend and stability of the companies according to years were investigated thanks to this method, which uses panel data and evaluates with moving average.

Keywords: Window Analysis; Data Envelopment Analysis; Dynamic Performance.

Dynamic Performance Evaluation of Three-State k-out-of-n:G Systems Using Lifetimes in terms of Order Statistics

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Abstract

In multi-state modelling a system or its components have a range of performance levels from perfect functioning to complete failure. Such a modelling is more flexible to understand the behaviour of many systems. It is assumed that the components and the system have three-states: perfect functioning, partial working and complete failure in this study. Dynamic performance of three-state k-out-of-n:G system structures are evaluated under non-homogeneous continuous time Markov (NHCTM) degradation process assumption assumed for both the components and the system. Some performance characteristics of two types of three-state k-out-of-n:G structures consist of independent and nonidentical components are studied. The permanent based representations for the survival probabilities are considered. The utility of order statistics in dynamic reliability assessment of those structures with components having time dependent failure rates is demonstrated. Numerical results are obtained and supported with some graphical illustrations.

Keywords: reliability analysis; permanents; non-homogeneous continuous time Markov process.

Data Envelopment Analysis for Effectiveness of Health Care Systems of Provinces: A Case Study in Turkey

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Abstract

The significance of health-care services is rapidly increasing in developed and developing countries. These countries are investing to improve their health-care systems. Thanks to the investments that are made for these systems in Turkey, the number of hospitals has increased by 33 percent since 2002. The number of medical applications increased by 234 percent and reached to 418 million from 124 million in the same period. These developments have inevitably led managers to develop new strategies in order to implement health services more effectively. These inevitable strategies should focus on achieving the highest output with optimum use of resources. In order to develop such strategies, the effectiveness of health-care units (hospital, health clinic, dispensary etc.) should be determined. In the case of multiple input and output events, data envelopment analysis is a frequently used technique. In this study, the effectiveness of health units of the 81 provinces in Turkey were determined using data envelopment analysis. Population, risky population, number of hospital, number of beds were used as an input; number of medical applications, number of hospitalized patients, number of days of hospitalization and number of surgery operations were used as an output in the data envelopment analysis model. The effectiveness of provinces was calculated separately for each year between 2012 and 2015. The reasons of the fluctuations in effectiveness values for these 4 years were investigated and discussed.

Keywords: data envelopment analysis; health-care systems; effectiveness of provinces

*Presenter

An Application on the Similarity of Turkey to the EU in terms of the Quality of Life Using Clustering Analysis

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Abstract

Quality of Life (QoL) is a major issue in many environments, from the houses, to workplaces, to life in general. QoL's improvement must be a significant goal of government's public policies because improving the efficiency of public administration and the quality of public services delivered to people are key to increasing trust in governments. During the last two decades, more and more companies, governments and institutions have started to investigate how the QoL of people can be improved. European countries that are aware of this situation focus on having high level of the QoL. In the present paper, it is aimed to answer the questions of whether Turkey is similar to European countries and, if so, which countries they are. Within the scope of the study, Turkey and 28 countries of European Union, one of the most powerful organizations in the World, were analysed using cluster analysis according to their quality of life indicators. The 54 factors that are located under the main headings of material living conditions, productive or main activity, health, education, economic and physical safety, governance and basic rights, natural and living environment were evaluated. Firstly, the factors which were used for clustering analysis were obtained with the help of factor reduction methods. Later, the clusters were determined using clustering analysis for 2007, 2011 and 2016, separately. The clusters which include Turkey were examined and the development of Turkey was evaluated.

Keywords: quality of life; cluster analysis; European Union

Model Based Estimation of Computed Tomography Images

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Abstract

Statistical methods are required to estimate computed tomography (CT) images from magnetic resonance (MR) images. The main purpose of estimating CT images was to get a fully MR based radiotherapy. Specifically, bone tissues and air are indistinguishable on MR images. But, there is a good contrast between soft tissue and other tissues on MR images. On CT images, there is eye-catching contrast between bone and non-bone tissues. Therefore, the main reason for CT estimation is to get improved bone tissues estimation and to use the estimated CT in fully MR based radiotherapy. The estimated CT images (also called substitute CT or Pseudo-CT images) are used for attenuation correction and dose planning in MR based radiotherapy. Gaussian mixture model (GMM) is used to investigate CT image estimation from MR images without taking spatial information into account. Markov random field (MRF) and hidden Markov model (HMM) are used to extend the approach by taking spatial dependence into account. Leave-one-dataset-out cross-validation method on five datasets (obtained from head of five patients) is used to evaluate the performance of the models. In terms of MAE, the use of spatial information improves the overall quality of CT image estimation. In this application, HMM is computationally faster and has superior performance on MRF. However, it has poor performance on bone tissues. On the other hand, MRF is computationally expensive and intractable for log-likelihood based model diagnostic. These two behaviour of HMM and MRF motivated this work to further probe the estimation of CT images from MR images by partitioning the data into bone and non-bone tissues. The partitioning of the data was based on CT value threshold. Skew-Gaussian mixture model (SGMM) and GMM applied on each partition. In terms of MAE, SGMM and GMM* (GMM applied to each partition) performed better than HMM and MRF on the bone tissues.

Keywords: skew-normal mixture model; Gaussian mixture model; Markov random field model; hidden Markov model

The Effect of Unemployment, Divorce Rate, Internal Migration and Education Status on Crime: An Assessment for Turkey

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Abstract

From past to present, crime existed through all human populations, and it surely will do in future. While this phenomenon is usually a subject of social sciences, it recently has begun to gain interest of economics. The objective of this study is to analyze whether there is a relationship between crime and the independent variables including unemployment, divorce rate, migration and education status (literate but no school completed) using dynamic panel data analysis via STATA software. A panel data set was set up for 26 geographic regions of Turkey (due to Turkish Statistics Institution classifications) for the years 2008-2014 and the generalized method of moments (GMM) estimator was applied to dynamic models of panel data. The results of the study show that although divorce rate and education status (literate but no school completed) are significant, the variables of unemployment and internal migration are insignificant for the effect on crime.

Keywords: dynamic panel data; generalized method of moments; crime; Turkey

Vehicle Routing Problem with Alternative Links from the Triple Bottom Line Accounting Perspective

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Abstract

In this study, we considered vehicle routing problems on networks with alternative direct links between nodes, and we analyzed the financial, environmental and social objectives in this context. There are many studies in the literature about vehicle routing problems, but most of these studies assume a single link between two nodes. However, in real life, there might exist several alternative direct roads between two nodes, and these roads might have differences in terms of their lengths and durations. For example, a road might be shorter than another but might require longer time due to traffic and speed limits. Similarly, some toll roads might be shorter or faster but require additional payment, leading to higher costs. Note that existence of alternative links between nodes is different than alternative routes between nodes. In this study, different than the models in the literature in which there exist at most one direct link between two nodes, we consider the case in which more than one direct link exist between two nodes. In our study, the model will need to determine itself which alternative link to use between two nodes, depending on the model objectives and constraints. Considering financial, environmental and social objectives, the link that is chosen by the model will depend on the appropriateness of the link with the model objectives. In this study, we consider the minimum fuel cost, driver wages and vehicle cost as the financial objective for the company, minimizing the CO_2 emissions and gas usage as the environmental objectives, and optimizing the driver working conditions/working hours, and minimizing the risks of accidents as the social objectives. With these objective functions, we aim to determine which routes, and which alternative links should be used at which times of the day in addition to the speed choices on each link.

Keywords: Vehicle Routing, Alternative Links between Nodes, Mathematical Programming

On The Norms Of *r*-Hankel Matrices Involving Pell and Pell-Lucas Numbers

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Abstract

Let us define $A = H_r[a_{ij}]$ to be a $n \times n$ *r*-Hankel matrix. The entries in the first row of $A = H_r[a_{ij}]$ are $a_{ij} = P_{i-j}$ or $a_{ij} = Q_{i-j}$ where P and Q denote the usual Pell and Pell-Lucas numbers, respectively. We found upper and lower bounds for the spectral norm of these matrices.

In this study, we construct *r*-Hankel matrices involving Pell and Pell-Lucas numbers and drive expressions of spectral norms for *r*-Hankel matrices.

Keywords: Pell Number, Pell-Lucas Number, *r*-Hankel Matrix, Spectral Norm.

Construction of Ovarian Cancer Pathway via Different Mathematical Models

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Abstract

Modelling of complex biological networks is one of the main branches in systems biology and more generally, in bioinformatics. Although a number of mathematical models have been developed to describe the biological activation of these complex structures, the small number of measurements, high dimension of the systems, i.e., large number of components in the description of the systems, and finally sparse connections between the systems' elements convert the estimation of these complexities challenging. On the other hand, understanding of real biological pathways is important since it enables us to explain the interrelations between the species of the systems, which can be genes, proteins and other substances. By this way, we can predict the systems' behaviour under various conditions and describe the diseases such as cancer or heart attack which are caused by the malfunctions in the activation of the signals within the networks.

In this study, as the novelty, we suggest a comprehensive modelling of the ovarian cancer's pathway via our recently developed models. The ovarian cancer is one of the cervix cancers' type that is the second most common cancers seen in women both in the world and in Turkey. In this study, we deal with only the genetic sources of this cancer by initially investigating all related genes in different pathways. Then, by merely using this gene list, we upload real datasets from genomic databases and construct an artificial ovarian cancer network. Finally, we infer the strength of the interactions among those genes. In modelling, we apply our recent proposal models, so-called, LMARS (lasso-based multivariate adaptive regression splines), LCMARS (lasso-based conic MARS) and random forest algorithm besides the most common modelling choice, namely, Gaussian graphical model, in the description of the steady-state activation of this cancer. In the end, we evaluate the performance of our suggested model with the known literature about this disease. The results show that our new models are successful in the validation of the biological knowledge and find new plausible relations between genes. Thereby, we consider that such detailed modelling can be helpful for the representation of other cancer types and open new avenues in diagnosis of the other complex systems' illnesses.

Keywords: Ovarian cancer; multivariate adaptive regression splines; random forest algorithm; modelling biological networks.

A Partially Adaptive Estimator for the Censored Regression Model Based on Generalized Normal Distribution

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Abstract

In censored regression, ordinary least squares estimates are biased and inconsistent when the dependent variable is censored. In such cases, the censored normal regression or tobit model has been considered as an alternative model. However, the maximum likelihood estimation (MLE) of the tobit model yields inefficient results when errors are not normally distributed. To cope with non-normality for the censored regression, one of the proposed estimators is partially adaptive estimators. The goal of this paper is to handle some estimators for the censored regression and also introduce a partially adaptive estimator for the censored regression model based on an error terms described by generalized normal distribution (GND). A Monte Carlo study is conducted to compare the considered estimators including the MLE of the tobit model in the case of different error distributions. It is observed that the partially adaptive estimator based on GND is better than the tobit estimator when the errors are non-normally distributed. A real life example is also provided.

Keywords: Censored dependent variable; Tobit model; Maximum likelihood estimation.

Effect of Threshold on the Performance Measures of Logistic Regression for Rare Events Data

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Abstract

Logistic regression modelling of binary dependent variables when one of the outcomes is rare, i.e. dozens to thousands of times fewer events (for example inflectional diseases, wars, political disagreements, or natural disasters) than non-events, is a problematic issue in statistical applications. It is well known that logistic regression shows tendency towards to the majority class, resulting in underestimation of probabilities for rare class. This unbalanced nature of rare event data violates the assumption of symmetry of logit link, thus the usual performance measure of logistic model becomes inappropriate. The aim of this study is firstly to evaluate new threshold values using simulated data sets with different degrees of rareness as a result of Receiver Operating Characteristic (ROC) analysis and thus Area Under Curve (AUC) investigation. Then a comparison of different performance measures of logit classifier is performed using proposed threshold values and the symmetric one. It was observed that the existence of a rare class highly affects the prediction performance of logistic regression, invalidating the usage of usual performance measure. Unbalanced data necessitates lowering the value of threshold at the degree of rareness and REC or F-M measure could be more appropriate to evaluate the performance of the estimated model.

Keywords: logistic regression; rare event; threshold evaluation; Area Under Curve (AUC)

Test Criterion of Model Fit For Fuzzy Models and an Application

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Abstract

Test criterion known as model fit have been used to define whether the model is convenient for the natural structure of data or not and to prove its validity and reliability in other words, for the optimization of a fuzzy model formulated by fuzzy logic approach.

In this study, it is aimed to show possibilistic odds which is one of model fits and which is frequently used for optimization of fuzzy models and the calculation of mean squares error values and interpretations on sample set by systematic displays. Estimated possibilistic odds values and member value of average lactation milk yields per animal which belongs to sample data set were obtained. Mean squares error which is used to evaluate model fit was calculated as 21,62 whereas mean member value was found as 0,89.

As a result of those values calculated it is found that model which was created by data set studied is compliant.

Keywords: possibilistic odds, membership function, symmetric triangular, minimizatıon

SELÇUK ÜNİVERSİTESİ

Modelling of siesmic data with Gumbel distribution: A case study in Bitlis

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Abstract

If random sample size n is $X_1, X_2, ..., X_n$, the probability density function for the Generalized Extreme Value (GEV) distribution is:

$$f(\mathrm{x}/\,\mathrm{k}, \mu, \sigma) = \left(\frac{1}{\sigma}\right)\exp\left(-\left(1+k\frac{(x-\mu)}{\sigma}\right)^{-\frac{1}{k}}\right)\left(1+k\frac{(x-\mu)}{\sigma}\right)^{-1-\frac{1}{k}}$$

where shape parameter $-\infty \le k \le \infty$, scale parameter $\sigma \ge 0$ and location parameter $-\infty \le \mu \le \infty$. In GEV distribution, $k>0$ corresponds to Frechet family and $k<0$ corresponds to Weibull family. Where $k=0$, this distribution converges to Gumbel family. The model to be used in this study will be a model dwells on the statistical behaviour of the variable $M_n = max\{X_1, X_2, ..., X_n\}$. In practice, X_i's generally represent the values of a process measured in a linear time period. In this study, the earthquake magnitude data for the years between 1907 and 2016 for 100 km radius area centred in Bitlis (38'N, 42'E) were used. R-2.12.1 software was used to analyse the earthquake data. From the histograms, it was visually understood that the distribution of the earthquake data roughly resembles to GEV distribution. Still, a goodness of fit test was used for this fitting. Firstly, in order to determine whether the data comply with GEV distribution, Kolmogorov-Smirnov Goodness of Fit test was used and it was determined that the earthquake data comply with GEV distribution (p>0.05). Then, parameter estimations for the GEV distribution were obtained using Maximum Likelihood Estimation Method. Variance-covariance matrix and standard errors of parameter estimations were determined. While obtaining parameter estimations, annual earthquakes with the maximum magnitude were addressed and block maxima method was used. As a result of the maximization of the log-likelihood function of the GEV distribution for the data, the value of the shape parameter was estimated as -0.4131. $k > -0.5$ indicates that maximum likelihood estimators comply with general asymptotic properties and distribution is restricted. Restricted distribution also means that data can be adapted to Gumbel distribution as well. The Gumbel distribution (GEV Type-I) is used to model the distribution of the maximum (or the minimum) of a number of samples of various distributions. It was determined with Kolmogorov-Smirnov goodness of fit test that the data comply with Gumbel distribution as well (p>0.05). With this distribution information, the probability of occurrence and replication periods in the future were estimated for the earthquakes in this area. As a conclusion, it was calculated that the probability of an earthquake with a magnitude larger than 4.6 within the next two years is 50%.

Keywords: Block maxima; generalized extreme value distribution; maximum likelihood.

Use of Support Vector Machines in Data Mining: Modeling Wind Speed

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Abstract

One of the main approaches in modeling wind speed is the use of statistical techniques. In this respect, one of the mostly preferred models are the Weibull and Rayleigh distributions, among many others. In recent years there are also applications of generalized models such as Kumaraswamy-G distributions. Due to the varying characteristics of the location and other factors, accurate prediction of wind speed is a challenging task. Support vector machines are one of the "state of the art" learning machines used in many areas of science, today. It is known that wind speed depends on parameters such as temperature, atmosphere, pressure, direction and humidity. In this study we investigate the use of support vector machines (SVM) in modeling wind speed using these parameters. The SVM model is applied to real data form the Turkish Meteorological Service. For computations the ENCOG software is used.

Keywords: support vector machines, data mining, modelling wind speed, Kumaraswamy-Weibull distribution

Comparison of Entropy Optimization Methods and Smoothing Splines in Estimation of Probability Density Functions

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Abstract

The estimation of the probability density functions (PDF) has an important role in the statistical analysis. There are some methods applying in estimation of PDFs. This study shows the utilization of Entropy Optimization Methods and Smoothing Spline Functions in estimation of PDFs. Entropy Optimization Methods (EOM) have a wide range of important applications, especially in statistics, economy, engineering, etc. There are some research in recent literature that statistical distributions fit to statistical data weakly; however the entropy optimization methods in fitting distributions do pretty well. The most widely utilizing methods for entropy in terms of a probability distribution are two optimization models based on the Maximum Entropy Principle (MaxEnt) and Minimum Cross Entropy Principle (MinCEnt) to estimate probability density functions. Another method that we used in estimation problem is smoothing spline technique. We have estimated the PDFs using following types of smoothing spline functions: penalized splines (P-spline) and smoothing spline. Spline function applied in this study is smoothing spline, as it constructs cubic spline basis function and penalty term to control more smoothness in approximation. Penalized spline constructs from the B-spline basis function and has a penalty term. The reason of utilizing this method, that it is a combination of polynomial basis and smoothness component known as smoothing parameter. The problem of choosing the smoothing parameter is one of the main problems in curve estimation. If we use fitting curves by polynomial regression, the choice of the degree of the fitted polynomial is essentially equivalent to the choice of a smoothing parameter. There are a number of different methods to choose smoothing parameter. For penalized and smoothing splines we used the usual Cross Validation score function. We used two dataset in order to compare the goodness of fit used techniques. First dataset are death times for 208 mice, which were exposed to gamma radiation. The data are divided into 14 time intervals and then we calculated smoothing spline and Entropy optimization to PDF. The second dataset consist of 400 measurements of radio range-meter. This dataset are taken from the book of Ventzel. Errors of measurements are divided into range intervals and amount of measurements. Obtained results are compared with each other using mean squared error (MSE).

Keywords: maximum entropy, minimum cross entropy, penalized spline, smoothing spline.

Numerical Solution of Finding the Leading Coefficient to the Time Derivative of Parabolic Equation with Nonlocal Boundary Conditions

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Abstract

In this paper the problem of determining the time-dependent leading coefficient to the time derivative of heat equation in the case of nonlocal boundary condition is considered. The integral overdetermination condition is used for the measured data. The conditions for the existence and uniqueness of a classical solution of the problem under considerations are established with Banach Fixed Point Theorem. Numerical solution of this problem are considered. Some numerical examples using the implicit finite difference scheme combined with the iteration method are presented and discussed. Also some numerical experiments like noisy data for stability are presented.

Keywords: Heat equation, Inverse problem, Nonlocal boundary condition, Integral overdetermination condition.

Geometric-Zero Truncated Poisson Distribution: Properties and Applications

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Abstract

In this paper, a new discrete distribution is introduced by compounding the geometric distribution with a zero truncated Poisson distribution, named geometric-zero truncated Poisson (GZTP) distribution. Some basic properties of the new distribution, such as hazard rate function, moments, mode, median, etc., are studied. We show mathematically and numerically that the hazard rate function is increasing. The model parameters are estimated by the moment, least square error and maximum likelihood methods. A simulation study is performed to compare the performance of the different estimators in terms of bias and mean square error. An application of the new model is also illustrated using the three real data set.

Key words: Compounding, Estimation, Geometric distribution, Zero truncated Poisson distribution.

Linear Regression Model with Change Points

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Abstract

In this study, we discuss linear regression type models allowing for one change as well as for multiple changes in the mean structure. Such a change is located at a specific point of the data is called the change point. In many practical situations, a statistician is faced with the problem of detecting the number of change points or jumps and their locations. This is known as the change point problem. Our goal is to estimate the number and locations of change-points that segment available data into different regions with interpretable models for each region. We consider models with both, discontinuous or continuous changes at the change points. We compare Akaike's information criterion (AIC), Schwarz information criterion (SIC) and Information complexity (ICOMP) by their ability to detect changes in a linear regression model.

Keywords: change point; segmented regression; Schwarz information criterion; information complexity.

Geostatistical Estimation of Iron Content Distribution of an Ore Body Using Kriging and Lognormal Kriging Techniques – A Comparative Study

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Abstract

One of the common problem of the diverse areas of the science such as earth, agricultural, environmental sciences is that estimation of the spatial distribution of a target variable in interest where no data is collected. The spatial estimation of target variable will be trivial if the collected data is dense enough to full-characterization the target variable at every location. Nevertheless, in real world applications, nearly infinite number of data have to be collected in order to make such a characterization, which is impractical and impossible due to the time and financial constraints. For these reasons, spatial estimation models are required to estimate the target variable of interest at the locations where no data is available using the collected data. Kriging family is the collection of such models commonly used and industry standard in spatial estimation. Simple kriging, Ordinary Kriging, Log-normal kriging are some examples members of the kriging family. As all other sciences mentioned above, in mining science only limited data can be collected to estimate the spatial distribution of target variables. For this reason, the kriging models are commonly used in spatial estimations related with mining. This paper aims to compare the Ordinary kriging (OK) and Log-normal kriging (LNK) estimation results of an iron content distribution of a mineral resource. For estimation purpose, solid model of the ore body is generated. This solid model divided in to equal sized blocks and estimations are performed using variogram models fitted. Results of the OK and LNK are compared. Results shows that total tonnage of the ore body is equal due to the same block model and density used in estimation, However, due to the different nature of the estimations techniques, spatial distribution of the iron content differs slightly for OK and LNK estimations.

Keywords: Spatial Statistics; Iron Ore; kriging; log-normal kriging.

Estimation of Spatial Components by Covariance Matching Kriging under the Linear Model of Regionalization

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Abstract

Estimation of variables with respect to their spatial components is widely used in areas such as geochemistry, geophysics, and soil sciences to reveal the behavior of the variables under different spatial scales. This is largely known as factorial kriging under the linear model of regionalization. Ordinary kriging (OK) is traditionally used for this purpose. In this study, covariance matching kriging (CMK) is proposed as an alternative spatial estimation method and compared with OK in spatial estimation of arsenic data which is decomposed into short and long scale components. Coherence of estimates and codispersion coefficients are considered in comparison. Full-scale estimates of CMK and OK are also compared with the sum of component estimates. Codispersion coefficients show that OK estimates are less correlated at short scales while CMK produces overall high correlation. In addition, sum of the CMK components is highly correlated with full-scale estimates when compared to OK estimates.

Keywords: Spatial components, Kriging, Covariance Matching Kriging, Factorial Kriging

The Investigation of the Number of Babies Born Alive in Multiple Pregnancies Using Quasi Poisson Model

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Abstract

Multiple pregnancies occurred more frequently with being widespread of the assisted reproduction techniques. The recent researches showed that the possibility of multiple pregnancies has been increased by some factors such as twin pregnancy experience in the family, mothers at later ages, social properties and the number of live-born infants. In this study, the number of babies born alive for pregnant who have multiple pregnancy diagnose are considered in 2015, Ankara province. The main goal of the study is to detect factors affecting the number of live-born infants using count data models. For this purpose, the effects of mother's age, the number of pregnancy, the method of delivery, mother's blood type and previous births of the mother are statistically analyzed using count data models. Quasi Poisson and Conway-Maxwell-Poisson (COM) regression models are used due to under-dispersion problem and these models are compared for the data set.

Keywords: Multiple Pregnancy; quasi poisson regression; underdispersion, COM poisson regression

Assessing the Biased Predictors in Linear Mixed Models via a Hypothetical Data Analysis

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Abstract

Linear mixed models are statistical models containing both fixed and random effects and so, they provide flexibility in fitting models with various combinations of fixed and random effects. These models are often used to analyze data in a broad spectrum of areas including clustered data such as longitudinal data, repeated measures and multilevel data.

To estimate the unknown parameters of the linear mixed models, Henderson et al. (1959) developed a set of equations called mixed model equations (MMEs) that simultaneously yield the Henderson's predictors which are respectively named as the best linear unbiased estimator (BLUE) of fixed effects and the best linear unbiased predictor (BLUP) of random effects.

Generally, the variables of design matrix for fixed effects are assumed as linearly independent. However, in practice, we may encounter with strong or near to strong linear dependencies between the variables of design matrix for fixed effects. Then, the problem of multicollinearity is said to exist.

In the existence of multicollinearity, the variances of BLUE may be quite large and BLUE may be far away from its true value. As a result of this case, the Henderson's predictors may be unreliable. In order to overcome the multicollinearity problems, Liu and Hu (2013) introduced ridge method to the problem of predicting for linear mixed models and put forward the ridge predictors in linear mixed models. Furthermore, the ridge predictors are derived in the context of Henderson's MMEs by Özkale and Can (2016).

Our primary aim in this study is to find alternative predictors in linear mixed models under multicollinearity. Motivated by this, we firstly get the principal components regression (PCR) predictors. Then, we introduce the r-k class predictors, which combine the ridge and PCR techniques into predictors in linear mixed models. We demonstrate that the Henderson's, ridge and PCR predictors are special cases of the r-k class predictors. We also investigate assumption that the variance parameters are not known and attain the estimation of variance parameters. The necessary and sufficient conditions for the superiorities of the r-k class predictors over the Henderson's, ridge and PCR predictors are obtained by the criterion of mean square error matrix. Finally, a hypothetical data analysis is conducted to illustrate the findings.

Keywords: multicollinearity; ridge predictors; PCR predictors; r-k class predictors.

Comparison of Nonlinear Regression Models and Least Square Support Vector Machines for Egg Production Curve Fitting

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Abstract

Egg production curves provide great benefits for decision makers on key issues such as the introduction of production patterns and animal breeding in poultry farming operations. Non-linear regression analysis methods have a wide range of applications in modeling time-varying data structures such as egg performance and egg weight. Kernel-based methods have been used as an alternative to nonlinear regression analysis, along with developing technology in recent years. The least squares support vector machines (LS-SVM) method is defined as a special type of kernel-based models and the modeling power of nonlinear regression analysis problems is quite successful. In this study, nonlinear regression analysis models and least squares support vector machines methods were examined comparatively for investigation of yield performance in laying hens. Adams-Bell, Compartmental, McNally, and Logistic-Curvilinear models were used in the nonlinear regression analysis. Three different Kernel functions were used to examine a numerical example for LS-SVM analysis. These are the radial basis function (RBF), the polynomial function and the linear function. The results of the analysis show that the method is quite successful and can be used as an alternative to classical regression analysis.

Keyword: Nonlinear regression, egg performance, least square support vector machine, kernel function.

Fuzzy Regression Analysis Using Back Propagation Neural Network for Prediction of Sheep Live Weight

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Abstract

Mathematical models are been used to evaluate the economic characteristics of farm animals. One of these characteristics; biological interpretation of live weight prediction, provides significant benefits to the producers and researchers in the field such as the meat production efficiency, the evaluation of the genetic structure and growth potential of animals, the understanding of the genetic and environmental factors affecting the growth of live weight and growth, and the taking of management and marketing decisions in the institutional sense in enterprises. In this study, used method provides prediction interval for sheep live weight values. One of the main features that distinguish fuzzy regression analysis from classical regression analysis is the inter-variable relation; which are uncertain and inputs and outputs can be included in the model as fuzzy numbers. The method discussed in the study predicts an interval for live weight values of sheep. Thus, it is aimed to present a new method of presenting a new viewpoint to the problems of regression analysis and realizing successful estimates with lower error rates. The analysis results were evaluated with error squared averages and average absolute error criteria. In this framework, fuzzy regression analysis based on artificial neural networks has been found to be quite successful and may be an alternative to classical methods. The results of the analysis show that the method is quite successful and can be used as an alternative to classical regression analysis.

Keywords: Fuzzy regression, artificial neural networks, interval prediction, live weight.

Examining the Efficiency of Health Systems of OECD Countries by Data Envelopment Analysis

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Abstract

In the view of the foregoing aspects, improvement and analysis of health care performance provided by country at international levels are all great importance. Public and private hospitals both should make the health services they provide to society, as well as the use of the resources, more effective and more efficient. Particularly, recent years decreasing the spendings on health care of countries has caused the global financial and economic crises. In this study, assessing the efficiency of health systems of OECD members by Data Envelopment Analysis (DEA) application, target input levels to increase the efficiency of inefficient countries thus to reach the efficiency frontier while keeping their outputs constant are analysed. In the analysis, the number of doctors, number of patient beds and health expenditure per capita were used as input variables and life expectancy at birth and infant mortality rate were used as outputs.

Keywords: Health system; OECD; Efficiency; Data envelopment analysis.

Stress-Strength Reliability under Alt-Exp Distribution

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Abstract

This paper deals with the estimation of stress–strength parameter R = P(Y < X), when X and Y are independent ALT-Exp random variables. The maximum-likelihood estimator (MLE) is obtained for the stress–strength parameter. The confidence intervals of R have been obtained by using both parametric bootstrap and MLE-based methods. A simulation study is also performed to investigate the coverage probabilities of these intervals.

Keywords: ALT-Exp distribution; stress-strength parameter; parametric bootstrap; confidence interval.

Shewhart Mean and Range Control Charts by Using New Ranked Set Sampling Schemes

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Abstract

In this study, we proposed Shewhart mean and range control charts under Ranked Set, Median Ranked Set and Neoteric Ranked Set Sampling schemes using the bivariate normal distribution. The performance of the mean and range charts by using classical simple random sampling and newly introduced sampling schemes are obtained via simulation study. In the simulation study we showed that our proposed control charts give more efficient estimates compared to classical simple random sampling scheme.

Keywords: Bivariate normal distribution; control charts; ranked set sampling, neoteric set sampling

Statistical Use in Articles Published in Veterinary Sciences

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Abstract

In this study, usage of statistical methods were investigated on published articles of researchers in the specifically field of Veterinary Science. 443 articles that published by *Turkish Journal of Veterinary and Animal Sciences; Journal of the Faculty of Veterinary Medicine,* Kafkas University; Veterinary *Journal of Ankara* University and Eurasian Journal of Veterinary Sciences between 2010 and 2016, have been selected and scrutinized to understand specific field of researchers used statistical methods in what extent. Broadcast scanning was done online. Publications were examined, and their classification has been done whether statistical methods used in that articles. Articles, need to use statistical method but actually did not use, were distributed according to the journal, their percentage has been given, and journals were compared with Chi square test. The results show that statistics had to be used in 4.07% of the 123 published articles at *Turkish Journal of Veterinary and Animal Sciences.* This ratio is 5.85%, 4.76%, and 4.17%, in the *Journal of the Faculty of Veterinary Medicine,* Kafkas University, Veterinary *Journal of Ankara* University and Eurasian Journal of Veterinary Sciences, respectively. This ratio was found 4.97% for all journals. The journals have been compared in terms of the rate of articles that are not used any statistical methods. The difference between the journals was not significant ($p > 0.05$). In the articles examined in this study, four journals were found to be in good level in terms of statistics usage. As a result; biostatistics experts should be at every stage of scientific study. There must be absolutely statistical experts in the editorial / review / advisory boards of the journals.

Keywords: Statistical method usage, veterinary sciences.

*Presenter

Assessing the Performances of the Universities of Turkey

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Abstract

The university is a teaching and research organization that consists of sub-sections such as faculties, institutions, and colleges which work academically in high level and provides specific specialties for students. Universities are one of the most important basic elements that provide technological, sociological and economic added value for countries. Turkey has recently realized important policies and investments in higher education. In this study, the recent performance of the universities in Turkey has been examined by using data envelopment analysis. The number of faculty members, the number of lecturers and instructors, the number of research assistants and the university budget were used as an input variables, whereas the number of associate degree and undergraduate students, the number of graduate students, the article score, citation score and the number of supported projects were utilized as output variables. According to the obtained results, the performances of the universities has been analyzed and interpreted.

Keywords: university; data envelopment analysis; Turkey.

The Ranking of Industrial Engineering Departments According To Education Quality: The Case of Turkey

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Abstract

Education is the process of development of skills, attitudes and other behavior forms of an individual based on the positive values of the society in which he lived. Besides personal development, education is of great importance because it provides a country's cultural, social and economic progress. Higher education institutions within education system are one of the most important sources of scientific and technological novelty. They also have a strategic role in economic, social and cultural development. Departments of Industrial Engineering (DIE) which contribute to spacious work areas such as service and manufacturing sectors are one of the important factors in this role of higher education institution. In this study, the education quality of DIE in Turkey has been investigated. The criteria affecting the education quality have been determined as numbers of faculty members (prof., assoc. prof. and assist. prof.) and instructor per student, the number of international paper and citations per instructor, and accreditation status etc. The education quality of Turkish DIE has been sorted by using these criteria via Grey Relational Analysis method. In addition, the obtained sorting has been compared to the ranking of the base point of Student Selection and Placement System Exam.

Keywords: ranking, industrial engineering, grey relational analysis.

Effect of 3D Discrete Wavelet Transform Based Filtering on Detection of Brain Activations by GLM in Functional MRI

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Abstract

Functional magnetic resonance imaging (fMRI) is a method, based on the detection of neuronal activity in the brain, which is used in brain mapping. The most common used imaging method with fMRI is Blood Oxygen Level Dependent (BOLD) technique which measures the homogeneity of the magnetic field due to the variation of the oxygen level in the blood. Due to the noisy and variable nature of the functional MR images, pre-processing steps should be applied prior to the activation detection. The pre-processing steps for fMRI are, motion correction, co-registration, normalization and smoothing. In this study, 3D Discrete Wavelet Transform (DWT) based filtering algorithm is used in place of the classical smoothing algorithm which is commonly used in fMRI denoising. The experiments were performed on the data obtained from SPM dataset which is publicly available. General Linear Model (GLM) based first level statistical analyse was applied to pre-processed fMRI data to detect the activations on brain. According to the results, with using Gaussian smoothing, activation occurs in 5 different regions. Besides, with proposed 3D DWT based algorithm, activation occurs in 13 different regions with less active voxels. Because of the blurring effect of Gaussian smoothing, detail information can be suppressed with the noise. Since weighted 3D DWT keeps these detail information, it provides a precision brain map with GLM.

Keywords: weighted 3D DWT, Brain Map, Gaussian Smoothing, GLM,

Comparison of the Amounts of Milk Obtained From Goats by Single or Twin Births

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Abstract

This study was conducted to determine the relative amount of daily milk intake from the breeders raised in the farmer's hands. This study was conducted at a commercial dairy goat farm in Kırşehir province. Milk samples were collected from 45 dairy goats once a month through 5 mounts and test day milk yield were recorded. Lactation curves of the goats gave birth twin and single were estimated by linear and nonlinear models. For this purpose linear model($\boldsymbol{y = a + bx}$), quadratic($\boldsymbol{y = a + bx + cx^2}$), cubic $\boldsymbol{y = a + bx + cx^2 + dx^3}$), power $\boldsymbol{y = ax^b}$), exponentional $\boldsymbol{\left(y = ae^{bx}\right)}$, and logistic ($\boldsymbol{y = a/(1 + be^{-cx})}$ were used. Cubic model was the best goodness of fit among models because of the highest coefficient of determination (R^2) and lowest mean square error (MSE) R^2 valves for the goats give birth single and twin were respectively 99,8% and 99,4% and MSE values were respectively 0.006 and 0.022 for Cubic model. However Linear Model had lowest R^2 valves and highest MSE valves among the models that were used in this study.

Keywords: milk yield, comparison, goat, growth model

*Presenter

Estimation of Population Proportion under Different Ranked Set Sampling Using Air Quality Data

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Abstract

The population proportion is the number of units with a particular attribute. This parameter estimation is very important in many statistical problems such as the estimation of proportion of a disease, proportion of a race etc. in the population. Sampling methods is also a very important issue in the statistical analysis. In this study we have studied the estimation of population proportion under simple random sampling, pair ranked set sampling and ranked set sampling designs. To compare the efficiency we used a real data set. In real data set we consider air quality data in Ankara. We have conducted a simulation study for different sample sizes under different sampling designs.

Keywords: ranked set sampling; pair ranked set sampling; proportion; efficiency.

Comparison of the Pairwise Post-Hoc Comparison Tests under Heteroscedasticity

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Abstract

There are many pairwise post hoc comparison tests are proposed for normal distributed groups. Their performances are investigated under different conditions. Most of them show poor performance under heteroscedasticity. After this deficiency is noticed, researchers are focused on the tests can detect the differences between groups in case of heteroscedasticity. Weerahandi proposed the Generalized Scheffe (GS) test for obtaining the differences between heteroskedastic group's means using generalized p value approach. In this study, GS test is investigated under various conditions with Monte-Carlo simulation studies using familywise error rates, per pair powers and all pair powers. To obtain the advantages and the disadvantages of GS test is compared with most used pairwise post hoc comparison tests using for heteroskedastic groups.

Keywords: pairwise; post hoc tests; generalized p-value; heteroscedasticity.

SELÇUK ÜNİVERSİTESİ

Effects of Hen Age on External Egg Quality Traits

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Abstract

Egg plays an important role in human nutrition because of its vitamins, mineral and essential amino acids contents. Egg protein is considered one of the highest qualities when compared to the other food proteins sources. On the other hand, its fat content is relatively low. Egg quality criterion (egg weight, specific gravity, shell strength, etc.) are influenced by several factors including hen age. The aim of this study is to compare the external egg quality characteristics of eggs obtained from hen different ages (36, 53, and 73 weeks of age). A total number of 90 eggs of white layers (Super Nick; 36, 53, 73 wk of age) were used in this study. The external egg quality characteristics included egg weight, egg specific gravity, shape index, shell thickness, shell weight, shell ratio, and shell strength. Laying hens at 73 weeks of age produced heavier ($P<0.01$) eggs than those at 36 weeks of age. However, shell strength was significantly ($P<0.01$) decreased with increasing hen age. The lowest eggshell ratio was obtained in eggs from 73 wk of age. The highest specific gravity value was obtained in eggs from 36 wk of age. No significant differences were observed in egg width, egg length, shape index, eggshell thickness, and eggshell weight among age groups. According to the result obtained from this study, hen age has significant effect on external egg quality characteristics.

Keywords: Hen age, shell strength, egg weight, shape index, shell thickness

Prediction of Number of Passengers in Public Transportation by Using Artificial Neural Network Method

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Abstract

In order to organize activities efficiently in the public transportation, there are some factors such as bus lines, stops, distances, traffic conditions etc. Before making the necessary planning and scheduling activities, it is important to estimate the demand for the lines and to determine the number of possible passengers. The most valuable data in determining the number of passengers is the old records from vehicles. The records need to be processed in order to be used in optimization activities. In this study, travel data belonging to public transportation lines were used. The number of passengers has been tried to be estimated by using Artificial Neural Networks technique for each line from former data. The predicted number of passengers will be useful for public transportation studies such as vehicle routing, staff scheduling, assignment, etc.

Keywords: Artificial Neural Network; Prediction; Public transport; number of passengers.

Interval Regression Model and an Application

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Abstract

In the fuzzy regression models that fitted by using fuzzy logic, every regression coefficient should be estimated at a certain level of a fuzzyness tolerance because of dividing the error value into the coefficient.

In this research, systematically display on the sample the calculation and interpretation of the fuzzy coefficient values and their deviations of the interval regression model was aimed. In the sample, for estimating the amount of mean royal jelly (mg) on per queen cell belongs to sample dataset, fuzziness of ınterval regression model that created in the 13 iteration 1321.478, variation 29.3 and fuzziness tolerance level of model which was higher than h=0.5 was calculated as h=0.64. It was concluded from the calculated results that examined dataset was compatible with created model.

Keywords: Fuzzy logic, Minimization, Fuzzy tolerance level

An Investigation on Ratio Estimation Methods Using Ranked Set Sampling and Median Ranked Set Sampling

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Abstract

Ranked set sampling (RSS) is a sampling technique used in cases where the measurement of sampling units according to the variable under consideration is difficult in all senses, but it is possible to rank them according to the same variable by means of other methods. In this study, ratio estimators of the population mean are investigated under simple random sampling (SRS), RSS and median ranked set sampling (MRSS) designs. Moreover, the mean square errors (MSEs) and the relative bias (RB) values of the ratio estimators using SRS, RSS and MRSS were obtained by Monte Carlo simulation and these estimators were compared according to relative efficiencies for different sample sizes, correlation coefficients and coefficient of the variation of the interested variable and the auxiliary variable. As a practical application, using the data about height and weight of the 167 fish living at the Keban Reservoir, the RSS were compared with the SRS in the sense of relative efficiency for different sample sizes. The results indicate that both the RSS and the MRSS estimators are more efficient than the SRS estimators for the same sample size and correlation coefficient. However, the MRSS estimators are more efficient than the RSS estimators.

Keywords: Median Ranked Set Sampling; Mean Square Errors; Relative Bias; Relative Efficiency; Monte Carlo Simulation.

SELÇUK ÜNİVERSİTESİ

MSEC Control Charts for Monitoring both Small and Large Shifts

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Abstract

A control chart is an important statistical tool for monitoring shifts in a statistical process, and it is largely applied in the industrial sector, the health sector and the agricultural sector, among others. The Shewhart control charts is a simple tool for monitoring a statistical process and used for detecting large shifts. However, it is insensitive to small shifts because it only uses information from the last sample observation. Exponentially weighted moving average (EWMA) control charts and cumulative sum (CUSUM) control charts, which are more sensitive to small shifts but less sensitive to large shifts, are used to monitor small shifts. In this study, to monitor both small and large shifts, we propose a new control chart called mixed Shewhart-EWMA-CUSUM control chart (MSEC). We evaluated the performance of the proposed MSEC in terms of the average run length (ARL) and compared the tests in terms of their performances.

Keywords: Average run length; Shewart; Exponentially weighted moving average; Cumulative sum; Monitoring shifts; Statistical process control.

Validity Index for Fuzzy Clustering

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Abstract

Clustering is the division of data into groups of similar objects. Clustering of genetic data is necessary to identify groups of genes that are biologically relevant. Traditional (hard) clustering methods exactly assign each gene to a cluster. This situation does not provide information about the effect of a particular gene for the overall shape of the clusters. In this study, we apply a fuzzy partitioning method, Fuzzy C-means (FCM), to attribute cluster membership values to genes. A major problem in applying the FCM method for clustering is the determining the number of clusters. The process of determining the number of clusters in FCM algorithm is called "Validity Indices". The cluster numbers were determined by using the validity indices in the literature on the two commonly used genetic data sets and the effect of the fuzzifier parameter which affects the FCM algorithm steps on the cluster selection was examined. According to the analyzes, validity indices do not always discover the optimal number of clusters. In the FCM literature, the fuzzifier parameter, which is usually fixed to 2, provides ease of calculation. However, the analysis shows that as the fuzzifier parameter goes to 1, the results are closer to the desired conditions for the indexes.

Keywords: Clustering, Fuzzy clustering, Fuzzy c-means, Validity index.

Alpha Power Lomax Distribution: Properties and Applications

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Abstract

In this study, a three parameter Lomax distribution is introduced using the alpha power transformation method proposed by Mahdavi and Kundu (2016). Several distributional properties, such as density function, moments, hazard and survival functions, and order statistics of the newly proposed distribution are studied. The maximum likelihood estimators of the unknown parameters are obtained. A small simulation study and a real data example are provided to illustrate the performance of the proposed distribution for modelling data sets. Real data example show that newly proposed distribution provides better fit than the other extensions of Lomax distribution.

Keywords: Alpha Power Transformation; Lomax Distribution; Maximum Likelihood Estimation.

Alternative Estimation Methods for the Estimation of Frechet Distribution Parameters

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The Frechet distribution is one of the important distributions in reliability theory. In applications, Frechet distribution is successful to model outliers. Frechet distribution is often used in many areas such as wind speed forecasting, rainfall forecasting, and earthquake prediction. Many methods have been proposed for estimating the parameters of the Frechet distribution.
In this study, the parameters of the Frechet distribution are estimated using the Least Square (LS) estimation method in linear regression analysis. In addition, the M estimation method, which is a robust alternative to least squares, is considered in linear regression analysis. In the M regression, different estimators (Huber, Andrews, Tukey, Cauchy and Welsch) are used. All estimators are compared according to MSE criteria.

Keywords: Frechet Distribution, Linear Regression, Least Square Estimator, Robust Estimators.

*Presenter

Some Bivariate Random Threshold Models Based On Order Statistics and Concomitants

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Abstract

Random threshold models are used in many areas such as hypothesis testing, statistical inference, in reliability, modelling air pollution and precipitation. Although there have been many articles about univariate random threshold models, there are only a few studies about multivariate random threshold models. In this context a new random threshold model is constructed on the basis of bivariate random variables. The finite and asymptotic distributions of new exceedance statistics are appeared to be distribution free, only depend on survival copulas. Numerical examples are provided for some well-known survival copulas and applications of these new results in medicine are discussed.

Keywords: Random threshold; exceedance statistics; asymptotic distribution; copula.

Usage of Interpolation Approaches on the Reduced-Dynamic Orbits of GRACE Satellites

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Abstract

The reduced-dynamic orbit of GRACE satellites can be considered as a reference orbits. Thus, the lots of information's about the dynamic behavior's of the earth can be inferred from these sorts of positions. In this study, the daily reduced-dynamic orbits of GRACE-A/B were determined with Bernese5.2 GNSS software and also the orbital positions were interpolated from 10-seconds to 5-seconds employing the different one-dimensional interpolation methods. Which are 3-degree polynomial, natural cubic spline and Lagrange polynomial approaches, respectively. After that the interpolation process, both obtained from Bernese software and interpolated coordinates with respect to interpolation methods were validated with GNV1B orbital positions in-itself, which is called the GNV1B validation. Thus, the main objective of this implementation is that whether the interpolation approaches can be ensured the quality of the orbit determination or not. The RMS values of the differences in each coordinate axes for 10-second orbital positions were ranged from 0.8 to 1.3 cm both GRACE-A and -B satellite. Interpolated epochs, which possess 5-second interval on daily orbit, were delivered 1 – 1.5 cm RMS precisions and the mean values of these positions were ~ 0.3 – 0.4 cm in all axes, approximately. Whereas the minimum values of differences were ranged from -1.9 to -1.2 cm, the maximum values are 2.2 to 3.5 cm. In addition to that the RMS-3d values were obtained as 1.5 cm and 2.0 cm with all interpolation approaches both GRACE-A and GRACE-B satellite orbits, respectively. Hence, all implemented interpolation approaches possess almost the same results in terms of both the measures of central tendency and positional RMS-3d. Although the principle of approximation properties are different from each other between the reduced-dynamic orbit determination and the implemented interpolation approaches, the acquisition success of the positional information can be can be derived from interpolation methods as compatible with several cm precision.

Keywords: orbit determination; low earth orbiter; GRACE mission; interpolation of orbit.

*Presenter

Evaluating Risk Factors Caused to Work-Related Musculoskeletal Disorders

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Abstract

Unfortunately, the existence of work-related disorders is undeniable in today's rush and challenging business life. It is quite potential to encounter various work-related disorders in any industry, from manufacturing to service, because of poor working conditions in real. These disorders can be determined easily with a quick-check investigation contains some kind of ergonomic risk assessments. One of the most outstanding work-related disorders is musculoskeletal disorders. Work-related musculoskeletal disorders (WMSDs) are originated from unfavourable conditions in workplaces related with the job such as applied method, used equipment, psychosocial and environmental conditions, etc. In addition to existence of these various risk factors that cause the disorders mentioned, diagnosing these WMSDs by healthcare specialists is also a hard task under these complicated circumstances. In order to help this diagnosis process, identifying the most important risk factors that cause WMSDs and making some risk assessments to prevent these WMSDs are essential in order to provide well-being of employees. In this study, identification phase of the risk factors caused to WMSDs is presented. The risk factors which were determined such as having effect on WMSDs were asked to health care specialists who are already working on WMSDs frequently in order to take their opinions. With gathered information belong to health care specialists; relations between risk factors were examined. Application in this area with some kind of statistical analysis is essential due to presentation of relations and precedence of the factors previously defined. As a result of this study, it is provided that diagnosis process of WMSDs becomes easier because the outstanding risk factors have already identified and prioritized.

Keywords: Survey analysis; work-related musculoskeletal disorders; ergonomic risk factors

Rank-Based Nonparametric Tests for Ordered Alternatives with Randomized Complete Block Design

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Abstract

When the data are not distributed normally and consists outliers, traditional analysis of variance (ANOVA) tests become invalid. Ranks with and without ties are considered within blocks to compose nonparametric test statistics in randomized block design. We adapted Shan's nonparametric test for randomized block design based on the rank difference between two pair of observations within a block in ordered alternative problem (Shan et al, 2014). This new adaptation test and other commonly used nonparametric tests for detecting ordered alternatives in randomized block design are compared empirically in extensive Monte Carlo studies in terms of type 1 error and power rates.

Keywords: Analysis of variance; Ordered alternatives; Randomized blocks; Monte Carlo study.

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On Several New Generalized Entropy Optimization Methods with Applications

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Abstract

In this study we have suggested new Generalized Entropy Optimization Methods (GEOM) for solving Entropy Optimization Problems (EOP) consisting of optimizing a given entropy optimization measure subject to constraints generated by given moment vector functions. These problems acquire in different scientific fields as statistics, information theory, biostatistics especially in survival data analysis and etc. Mentioned problems in the form of $\mathrm{GEOP2}, \mathrm{GEOP3}$ based on $\mathrm{GEOP1}$ have Generalized Entropy Optimization Distributions: $\mathrm{GEOD2}$ in the form of $\mathrm{Min_D\,MaxEnt}$, $\mathrm{Max_D\,MaxEnt}$; $\mathrm{GEOD3}$ in the form of $\mathrm{Min_H\,MinxEnt}$, $\mathrm{Max_H\,MinxEnt}$, where H is the Jaynes optimization measure, D is Kullback-Leibler optimization measure. It should be noted that formulation of $\mathrm{GEOP1}$ uses only one optimization measure (H or D), however each of formulations of $\mathrm{GEOP2}, \mathrm{GEOP3}$ uses two measures H, D together. $\mathrm{GEOP\,1,2,3}$ are conditional optimization problems which can be solved by Lagrange multipliers method. It must be noted that calculating Lagrange multipliers can be fulfilled by starting from arbitrary initial point for Newton approximations of constructed auxiliary equation. There are situations, for example in survival data analysis, when both MaxEnt and MinxEnt distributions are accepted to given statistical data (or distribution) in the sense of same goodness of fit test. For this reason, developed our methods to obtain distributions are fundamental in statistical analysis. Analogous generalized problems can be also considered by the virtue of other measures different from H, D in dependency of requirements of experimental situation. Moreover, it is considered several statistical examples and developed GEOM are applied to mentioned examples. Results are compared with results obtained by using other methods. Numerical solving considered problems is realized by MATLAB programme.

Keywords: Generalized entropy optimization measures, Generalized entropy optimization methods, Moment vector functions

*Presenter

Vortex Shedding Frequency Estimation of a Circular Cylinder with Splitter Plate at Incidence Using Artificial Neural Network

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Abstract

Bluff bodies such as a circular and square cylinder encountering in many engineering applications has significant disadvantages like vortex induced vibration that can be lead to resonance. Therefore, prediction of vortex shedding frequency has vital important in engineering application areas. In the present study, prediction of vortex shedding frequency leading to vibration of circular cylinder with splitter plate at incidence is carried out by using artificial neural network (ANN). ANN model data set include cross-section area, attack angle and velocity. Cross-section area, attack angle and velocity used as input parameters in train, validation and test. Activation function is sigmoid. ANN model using Levenberg-Marquardt backpropagation as training algorithm was trained to predict vortex shedding frequency and these data are randomly divided as 70% training, 15% validation and 15% test. Developed ANN model shows good performance for vortex shedding frequency. Results of ANN model indicated that developed ANN model can be predicted vortex shedding frequency and used to decrease the number of required experiments.

Keywords: Vortex shedding; circular cylinder; splitter plate; ANN.

Aerodynamic Force Estimation of A NACA 0015 Airfoil with DBD Plasma Actuator Using Artificial Neural Network

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Abstract

Flow control with dielectric barrier discharge (DBD) has significant importance because of its simple structure, rapid responds and light weight. In the laboratory research, DBD plasma actuator producing ozone and required high voltage pose a threat for the researcher. Therefore, In order to decrease the number of experiments, artificial neural network (ANN) can be help to extinguish this threat for the researchers. Prediction of the aerodynamic forces like drag and lift acting on a NACA 0015 airfoil with/without DBD plasma actuator is carried out by using ANN. DBD plasma actuator is worked at driving voltage of 6 kV and driving frequency of 3.5 kHz. ANN model data set include attack angle of the airfoil and electrode geometry of plasma actuator. The experiments were carried out at the wind tunnel in Reynolds number of $5.4x10^4$. Attack angle and electrode geometry used as input parameters in train, validation and test. Activation function is sigmoid. ANN model using Levenberg-Marquardt backpropagation as training algorithm was trained with 40 data so as to predict lift and drag coefficient and these data are randomly divided as 70% training, 15% validation and 15% test. Developed ANN model shows good performance for prediction of lift and drag coefficient. Results of ANN model indicated that developed ANN model can be predicted lift and drag coefficient and used to decrease the number of required experiments.

Keywords: Drag force; Lift force; NACA 0015 Airfoil; ANN.

Efficiency Analysis of Manufacturing Firms In Turkey: The Application of Malmquist Index

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Abstract

In today's global and highly competitive economy, organizations are constantly monitoring their performance and the performance of their competitors. With technological advancements and increased expectations from consumers, time becomes a critical factor in an organizations' ability to sustain their advantage over competitors. By understanding the multiple components which compose their performance and quickly identifying and addressing inefficiencies within the systems, an organization can maintain and possibly increase their share of the marketplace. In this study, it is aimed to measure the efficiency and the total productivity of 16 companies in the manufacturing industry sector traded in the Stock Exchange Istanbul (BIST) for 2013-2015 period by Malmquist Total Factor Productivity (MTFP) method. The efficiency of the companies was compared using financial statement data of the years 2013-2015 published in Public Disclosure Platform. These 16 firms include firms in the food and basic metal industry sectors which have the highest added value in the manufacturing industry sub-sectors. The efficiency of the decision processes, which can be divided into two stages, has been measured for the whole process as well as for each stage independently by using the conventional MTFP methodology to identify the causes of inefficiency. The first stage inputs of this study are the number of employees, total assets and capital receipts, the outputs of first stage are revenue and operating expenses. The second stage inputs are revenue and operating expenses, the second stage outputs are net profit margin, operating profitability, return on assets and profitability of equity. Firstly, the technical activities of each company were determined, and then the changes in total factor productivity were measured, and then the change in the components causing these changes was measured. Secondly, by examining the effectiveness of the decision making units (DMU) in the subordinate processes, the cause of the general influence was tried to be revealed. According to the results of the analysis, it is seen that in the period of 2013-2015, firms had a 46.8 % decrease in total factor productivity and the total factor productivity of only two companies was higher than 1. Finally, it is considered that the firms had a decline in overall efficiency because their financial performances were lower in the second stage, even though their performance in the first stage was high.

Keywords: Efficiency; Malmquist Index; Data Envelopment Analysis**.**

*Presenter

Performance of Different Shrinkage Parameters in Ridge Regression According To Mean Square Errors Criteria

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Abstract

Multiple linear regression is one of the statistical methods that is widely used in many field and helps the existing relations between variables reveal. Researchers doing data analysis use it to set models. Least Squares (LS) method is a common method to estimate regression coefficients. However, for LS method to give accurate results some assumptions should be provided. One of them is the existence of no multicollinearity among explanatory variables but this condition cannot be always realized in reality. In such situations the use of LS estimate method causes inaccurate model findings and use. Some methods have been developed to analyse using the explanatory variables having dependence with each other. One of these methods is biased estimation method. The estimators regarding biased estimation methods are biased with respect to LS estimators but gives estimations with less variance. One of the most widely used biased estimation methods is Ridge Regression. The purpose of Ridge Regression is to obtain smaller mean square errors (MSE) than the LS method. In this method, the selection of the shrinkage parameter is very important. By using the optimum shrinkage parameter, more accurate results can be obtained than the LS method. Many different optimum k values are described in the literature. Some of the most popular k values in the literature can be given as follows: Hoerl and Kennard (1970), Theobald (1974), Hoerl et. al.(1975), Lawless and Wang (1976), Khalaf and Shukur (2005), Alkhamisi and Shukur (2008) and Muniz and Kibria (2009), Muniz et. al. (2012). In this study, 36 popular k values were compared according to their MSE criteria via a Monte Carlo Simulation. The simulation results show that different optimum k values give the best results for different parameter combinations.

Key Words: Multicollinearity; Ridge Regression; Biasing parameters; Monte Carlo Simulation.

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Comparison of Service Quality of Private, Public and Participation Banks: The Case of Konya

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Abstract

The banking sector has an important place in Turkey's financial system with its large share. The evaluation of service quality in this sector is a very important issue. Therefore, banks are trying to provide different and better service quality for their customers. Banks, often perform this application by measuring customer satisfaction. If there is any dissatisfaction, improvements are made in the related services. The aim of this paper is to compare customers' expectations and perceptions towards the quality of services provided by Private, Public and Participation Banks in Konya. In this study, SERVQUAL measurement model was used to measure service quality. SERVQUAL is a multi-dimensional research instrument and frequently used in literature, designed to capture consumer expectations and perceptions of a service along the five dimensions that are believed to represent service quality. The research is designed to examine the differences between perceived and expected service qualities for the three bank types were analyzed along with their sub-dimensions.

Keywords: Banking, Private, Public and Participation Banks, Service quality, Servqual

Evaluation of Life Satisfaction Survey by Using Integrated SEM and Fuzzy MCDM Methods

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Abstract

Life satisfaction measures how people evaluate their life as a whole rather than their current feelings. Life Satisfaction Survey (LSS) in Turkey have been conducted in order to measure personal satisfactions and public services satisfactions of the individuals. Life Satisfaction Survey (LSS) has been carried out regularly since 2004. Life Satisfaction Survey by Provinces (LSSP) was first implemented in year 2013 in order to produce estimations by province level.

Structural Equation Modeling (SEM) is a multivariate statistical approach that includes multiple regression, factor analysis, path analysis and multivariate analysis of variance, to test hypotheses about the relationships between observed and latent variables. Fuzzy Multiple Criteria Decision Making (FMCDM) is a method widely used for evaluating decision making problems which contains multiple, generally conflicting criteria under the fuzzy environment.

In this study, we introduced an integrated method based on SEM and FMCDM which consists of two phases. In the first phase, the relative weights of each criterion and related sub-criterion are computed through SEM. In the second phase, linguistic evaluations by the decision makers for the alternatives are made and ranking of the alternatives is constituted by using FMCDM methods. In the application part, the integrated method is applied to evaluate LSSP considering two important life satisfaction criteria (personal satisfaction and public service satisfaction), and provinces which are taken as alternatives.

Keywords: Fuzzy Multiple Criteria Decision Making, Structural Equation Modeling, Life Satisfaction Survey

*Presenter

Awareness on Ergonomics within the Occupational Health and Safety Context

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Abstract

Harmonization process to EU structure required Turkey to enact several legislations which also include changes in laws and regulations on occupational health and safety (OHS). The Occupational Health and Safety Act No. 6331 has brought several obligations to employers such as employing an occupational physician, to perform a risk assessment in the workplace, to obtain health screening prior to the start of the work, with the aim of protecting occupational health and safety of the employees. Businesses are now obliged to manage the risks on their own or by the help of joint health and safety agencies (JHSA). One of the fundamental issues in risk management is the identification and assessment of the risk factors within a working environment. Among the potential risks, ergonomic risks are considered in this study. Ergonomics has great impact in terms of not only the health and safety of employees, but also enabling the desired working efficiency at the workplace. Significant gains can be obtained such as increased operational efficiency, reduced waste, better quality production and increased productivity and motivation of the operators if the workplaces and tools are designed considering ergonomic principles. Adversely, poor ergonomics in a workplace may result in increased number of work-related musculoskeletal disorders and related occupational injuries in a company in addition to its detrimental operational and financial effects.

Within this context, the objective of this study is to investigate the awareness of ergonomics in the companies. However, this concept should be studied within two dimensions for the companies working with a JHSA; i.e. from the company's perspective and the agency's perspective. For this purpose, a survey was generated and applied to companies that work with an agency. The study comprised of 44 various-sized companies from different sectors, of which the OHS service is given by an agency. The agency wants to further improve its OHS services on the subject of ergonomics. The questionnaire was filled through face-to-face interviews with the OHS representatives of the customers of the agency. The collected data were evaluated using descriptive statistics and inferential statistics. The results show that the companies' awareness on ergonomics is reflected by the awareness of the agency. Thus, it can be stated that the JHSA's awareness is the main identifier for the company's awareness on ergonomics, which can be comprehensively improved when the agency's awareness is improved. Specifically, the possible factors that should be used to improve the awareness such as the existence of an ergonomic risk assessment program in the agency, stating the evidences of ergonomic workplace designs in the improvement of worker productivity, support of executives, the ergonomic risks at workplaces are evaluated in detail by using the results of the survey. Interestingly, all the companies state that the awareness should be improved whereas the majority of them state that the executive support is not important.

Keywords: awareness; ergonomics; occupational health and safety; survey analysis

Expression and Prognostic Value Of Aldehyde Dehydrogenase 1 (ALDH1) and Synuclein Gamma İn Rectal Adenocarcinoma

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Rectal cancer survival in all stages of colorectal cancer tumors is considered to be the most negative, nowadays in favor of rectal cancer survival rate varies. Optimization of surgical technique and neo- adjuvant treatment of rectal cancer in recent years of the five -year survival from colon cancer seems to have led to better. In the treatment of early stage rectal tumor patients cornerstone of curative treatment is surgery. However, transmural invasion and / or positive perirectal lymph node in patients with local control and cure of the radiotherapy and chemotherapy.

ALDH1 with cancer stem cell marker expression in resistance to chemotherapy, tumor progression and metastasis have been shown in studies was significant. In recent studies metastatic and advanced breast-ovary, liver, prostate and colon cancer abnormal unlike normal tissue has been shown that the expression of γ-synuclein. Expression of γ-synuclein breast cancer cell proliferation, invasion and metastasis is associated with. In our study, we aimed to determine the importance of gamma- synuclein andALDH1 expression association with tumor aggressiveness and prognosis in rectal cancer.

Tumoral and nontumoral mucosa samples of 55 rectal resection specimens were analyzed. The expression of both ALDH 1 and Gammasynuclein was investigated the relationship with prognostic parameters of the rectal adenocarcinomas.

Consequently, Gamma synuclein wasn't expressed in rectal cancer and normal rectal mucosa. The ALDH 1 expressions showed in different staining forces were not statistically significant.

Keywords: Adenocarcinomas; rectum; ALDH-1; synuclein gamma

*Presenter

Parameter Estimation for Skew Normal Distribution via the Maximum Lq-Likelihood Estimation

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Abstract

The skewed distributions are widely used modelling the data in real life especially in the econometric data. The Azzalini type skew normal distribution introduced by Azzalini (1985) can be used as a skewed alternative to the Normal distribution in such cases. In this work, we will propose new estimators for the parameters of the Azzalini type skew normal distribution by using the Maximum Lq (MLq) estimation method. We will provide a small simulation study and a real data example to compare the performance of the MLq and the Maximum likelihood (ML) estimators in the presence of outlier in the data.

Keywords: Lq method; outlier; parameter estimation; skew distributions.

Fuzzy C-Means Clustering Method for Biological Data Set

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Abstract

Clustering analysis is an unsupervised learning technique that helps to separate subgroups according to the similarities of existing data. Recently, these techniques have been used frequently in the fields of biostatistics and bioinformatics to classify similar genes or patients, to group sequences having a gene family, and to gene and protein synthesis. However, hard (traditional) clustering methods which exactly assign each gene to a cluster are not very suitable for the analysis of complex and very large biological data sets, because the clusters of observation in such data clusters often overlap in nature. Contrary to hard clustering techniques, fuzzy clustering methods, which are more soft techniques, can provide more information by using this situation. Fuzzy C-Means (FCM) is an important algorithm of fuzzy clustering techniques and, the FCM algorithm enable each observation to belong to all clusters through the real valued membership value. In this study, a data frame with 40 observations over 6 variables is considered. Optimal initial parameters have been determined and clustering analysis has been performed with Fuzzy C- means algorithms. As a result of the analysis, it has been seen that some observations are still indecisive and the "constraint of being well-separated ", which is expected to occur when the algorithm is applied, is not fully achieved. It is thought that the random values of the initial parameters are effective for this situation.

Keywords: Clustering; Fuzzy Clustering; Fuzzy C-Means; Biostatistics.

Classification of Patients According to Their Risks of Restenosis Using Multi Criteria Classification Models And Regression Techniques

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Abstract

Aging and some lifestyle habits cause plaque accumulation in the blood vessels of the heart and this causes narrowing of the arteries. Stents are tiny wire mesh tubes which are used in balloon angioplasty to keep the vessel open. However, the stented vessel has a risk of re-narrowing due to the recovery response of the stented segment. This is called in-stent-restenosis. The objective of this study is developing a model that classifies patients according to their risks of restenosis by using operations research and statistical tools. With the help of this model, it is intended to bring patient specific follow-up proposals in order to protect patients from occurrence of an emergency case, more medication requirement, and risk of losing effectiveness of treatment. In this context, under the umbrella of multi criteria decision analysis and preference disaggregation analysis a mathematical model based on the UTADIS method is developed. Besides that, logistic regression models are utilized for classifying patients according to their risks of restenosis. True positive rate (i.e. percentage of patients who are correctly identified as having restenosis) and true negative rate (i.e. percentage of patients who are correctly identified as not having restenosis) are the performance measures of the models. From the point of this performance measures, it is observed that our mathematical model works better in true negative rate (True positive rate: 50%, True negative rate: 83%, approximately); whereas the logistic regression approach gives better results for true positive rate (True positive rate: 83%, True negative rate 59%, approximately).

Keywords: multi objective decision analysis; preference disaggregation analysis; logistic regression; healthcare.

Sparsity Estimation in Compressive Sensing

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Abstract

Compressed sensing (CS) initially emerged around the year 2004. The theory of CS is that an unknown signal $x \in R^N$ can be accurately recovered from m measurements with $m \ll N$ provided that x is sparse. Most of the recovery algorithms need sparsity level $\|x\|_0$ as an input. However, generally $\|x\|_0$ is unknown, and the problem of directly estimating sparsity has been being a open problem. In practice $\|x\|_0$ is commonly estimated empirically. In this paper, we use magnetic resonance imaging (MRI) data as input signal, after wavelet de-noising it becomes a sparse signal x and propose a model to estimate $\|x\|_0$ by using Bayesian hierarchical model (BHM). The result is promising that the $\|\hat{x}\|_0$ is quite close to the true $\|x\|_0$.

Keywords: MRI, BHM, Matern covariance

Optimal B-Robust Estimators for the Parameters of the MOEBXII Distribution

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Abstract

Marshall-Olkin Extended Burr XII (MOEBXII) distribution, a generalization of Burr distribution by Saiari et. al. (2014), is a flexible distribution that can be used in many fields such as actuarial science, economics, life testing and reliability, failure time modeling. The parameters of the MOEBXII distribution are usually estimated by the classical estimation methods such as maximum likelihood and least squares. However these estimators are non-robust, in the sense that it is very sensitive to outliers that is often encountered in practice. To overcome this problem in Burr XII distribution, optimal B-robust estimation (OBRE) method is proposed by Dogru and Arslan (2015) to find robust estimators for the parameter of the Burr distribution. In this work, similar to their study, we will propose to use the OBRE method to estimate the parameters of the MOEBXII distribution. We provide some simulation results and a real data example to show how much improvements over the ML and LS estimators are obtained by OBRE in terms of bias and mean square error.

Keywords: Marshall-Olkin extended Burr XII (MOEBXII) distribution, optimal B-robust estimator, maximum likelihood estimator, least squares estimator.

Comparison of Confidence Interval Methods for Population Coefficient of Variation

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Abstract

Numerous studies have focused on confidence interval for population coefficient of variation in normal and nonnormal distributions. There are studies which address the comparison of these confidence intervals by certain simulation designs in the literature. In this study, eight confidence intervals for population coefficient of variation which are suggested by Hendricks and Robey, Sharma and Krishna, McKay, Miller, Banik and Kibria are introduced and these confidence intervals are compared with each other by more extensive simulations than they have been in previous studies. Sample sizes of n= 10, 15, 20, 25, 30, 50, 100 which are generated by Normal(4,1), Beta(3,2), Beta(1,3), Gamma(4,1), Gamma(3,2), Gamma(1,4), Lognormal(0,1), Weibull(0.5,1) and Weibull(1,1) distributions are selected with 5000 repetitions for each sample size. Bootstrap sample count is 2000 for the confidence intervals based on Bootstrap method. These confidence intervals are compared based on two criteria which are coverage probabilities and average length widths. It is concluded that confidence intervals based on Bootstrap give better results than others for highly skewed distributions.

Keywords: Simulation study, Bootstrap, Coverage probability, Highly skewed distributions

Detection of Outliers in Survival Data by Using Press-Type Residuals

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Abstract

Outlier detection is an important task in survival data applications. There are many studies focused on developing diagnostic tools to identify extreme individuals. Most of these studies rely on residual analysis. But actually many of the commonly used residual analysis methods should not be directly used for the identification of outliers. Because there is a very high probability of masking and swamping since the lack of robustness of the survival models. Also most of these methods often identify censored observations that are not outlier as outlier.

In this study a new method for identification of outliers in survival data is proposed. The performance of the proposed method was examined through simulation studies and a real data application is performed.

Keywords: outliers in survival data; press-type residuals; robust estimation.

A New Concept for Fractional Quantum Calculus: (β;q)-Calculus and Its Properties

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In this article, authors give the definition of (β; q)-derivative and integral firstly in the literature which is a new type of quantum derivative and integral. Also some basic properties of (β; q)-derivative and integral are given.

Keywords: (β; q)-derivative; (β; q)-integral; q-calculus.

New Exact Solutions of Nonlinear Conformable Differential Equations Arising In Mathematical Physics

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Abstract

Main goal of this paper is to have the new exact solutions of some conformable time fractional partial differential equations (PDEs). The applicability of chain rule and attainability of the derivative of composite function enable the equations to be reduced to some ordinary differential equations by using some wave transformations. The sine-Gordon expansion method is employed to have the new exact solutions of time fractional PDEs where the fractional derivatives are in conformable sense. It is the first time that the implementation of this method to a conformable PDE.

Keywords: Conformable Fractional Derivative; sine-Gordon expansion method; Exact Solution.

SELÇUK ÜNİVERSİTESİ

Robust Bayesian Estimation in Regression using Ramsay-Novick Distribution

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Abstract

Bayesian treatment of uncertainities have created the concept of robustness for the two major ingredients of Bayesian analysis, which are typically the sampling model and the prior distribution. In regression modelling settings, the first one considers the choice of a measurement error distribution less sensitive to the departures from the original modelling assumptions (i.e. likelihood robustness). A number of outlying measurements are known to be the major source of deviations from the usually assumed Normal model. One way of achieving inferences more robust to outliers is to employ a unimodal heavy-tailed error distributions. Ramsay-Novick distribution within the class of heavy-tailed distributions comes here as an intriguing choice. It differs from the others because robustness is here achieved by modification of an unbounded influence function of a non-robust density so that it has more resistance to outliers.

Prior robustness comes into the consideration when it is desired to pool information from multiple or dissimilar studies or sources (subjective beliefs) for the model parameters. Prior elicitation of this form may reveal discrepancies with the sampling information, causing the posterior summaries to be highly affected. The influence of such priors could also be bounded by the choice of a heavy-tailed prior density as an alternative to flat or non-informative priors which are naturally robust. The univariate Student-t family of distributions is a natural choice in this respect as the tail tickness can be controlled with a properly chosen degrees of freedom.

The aim of this study is therefore to propose robust bayesian estimators of a regression model with Ramsay-Novick distributed errors and the prior information represented by a Student-t or Normal distribution. A simulation study for the performance assessment was performed by including outliers in $x-$, $y-$, $x-y$ direction to data generation process, and also considering informative and non-informative prior settings. That is followed by a real-data application on the data famously known as "stack loss data" in the literature. Both simulation study and the real data example demonstrated that robust bayesian estimates with Ramsay-Novick likelihood and heavy-tailed prior are robust against outliers in all direction.

Keywords: robust bayesian regression, ramsay-novick distribution, heavy-tailed distributions, student-t prior

*Presenter

A Study on Sleep Spindles by Separating Frequency Components of Sleep EEG with Extended Kalman Filtering

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Abstract

Sleep spindles, which are believed to have important role of reinforcing the sleep duration, are the characteristic wave shapes seen in non-REM sleep phase and belonged to the second phase of the sleep. The increase of the density of spindles with the start of sleep duration leads to the preoccupation of spindles' playing a crucial role in the formation and maintenance of sleep. Although there is not any explicit consensus about the formation and the function of the spindles, there are two accepted assumptions. According to the first assumption, spindles are the oscillations that maintain the state of the sleep. According to the second assumption, spindles lend assistance for the necessary defragment of gathering the previous experiences in the fields of thalamocortical and corticocortical. Spindles having transient regime properties and lower amplitude than background EEG signs make the recognition and decomposition of spindles complicated. Automatic detection and analysis of wave shapes of spindles are substantial for being able to be objectively evaluated. For that purpose different methods have been developed. The huge amount of the data obtained during the period of 8 hours makes the requirement of using the consecutive prediction methods. In sleep studies, finding the onset and offset points of spindles and figuring out the distribution of them throughout the sleep EEG are used to obtain the sleep scores.

This study aims to show the spindles in the sleep EEG by separating components of EEG and making frequency analysis of these components on the base of the model which evaluates the addition of two components, are of which is trend and the other is changeability.

Key words: Sleep, Spindles, EEG, Kalman Filter

Examining of a Bounded Influence Estimator on a Real Life Problem

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Regression analysis is a statistical technique used to model the relationship between a dependent variable and one or more independent variables. This analysis uses classical methods such as ordinary least squares in order to estimate the approximate relationship between those variables. However, the ordinary least squares (OLS) is very sensitive to the presence of outliers in the data set. In regression analysis, outliers can arise in the x-direction and/or y-direction. In the presence of outliers in regression analysis, the usage of robust regression methods has been suggested to be an alternative to OLS. Different robust regression methods have different abilities with respect to the type of outliers. The study focuses on bounded influence estimators resistant to outliers in the directions of x and y. The aim of the bounded influence estimators is to make a bound for the influence of outliers in both of x and y directions by using some weight functions. In this study, the bounded influence M estimator with Schweppe weights has been used on a real life dataset. The results of the analysis have been compared with OLS results.

Keywords: robust regression; generalized M estimator; outlier.

Spectral Theory of Discrete Analogue of Sturm-Liouville Operator

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Abstract

Spectral analysis of Sturm-Liouville operator plays an important role in various branches of science like mathematical physics, quantum mechanics and engineering. In this study, we define the discrete analogue of the Sturm-Liouville operator. Along with investigating the Jost solution, eigenvalues and spectral singularities of the discrete Sturm Liouville equation, we establish several analogies between the continuous case and discrete case of this equation. We also present the conditions for the finiteness of the eigenvalues and spectral singularities of this operator for both continuous and discrete cases.

Keywords: eigenparameter; spectral analysis; eigenvalues; spectral singularities.

High Resolution Topographical Point Cloud Data Processing With R Programming

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Abstract

Airborne and space technologies have highly increased the amount of spatial data availability. The earth observation via remote sensing technology with multi type of measurement devices such as terrestrial laser, airborne LiDAR and unmanned aerial vehicle (UAV) based techniques continue to make great contributions to gather of the spatial data. In order to mapping, LiDAR and aerial or ground photogrammetry has largely been used for surveying and geoscience applications. All of these spatial data sources are usually points or called as point clouds which is representing dense point position of coordinates (*x, y, z*). In this paper we present the spatial data processing with existing R software packages to generate digital terrain models.

Keywords: R Software, point cloud, processing, DTM.

SELÇUK ÜNİVERSİTESİ

Geometric Shapes Fitting To 3D Terrestrial Laser Scanner Point Clouds

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Abstract

We present a method for 3D reconstruction of geometric shapes using a point clouds with acquired by terrestrial laser scanner. The reconstruction of primitives is crucial task for multi stationary scan applications for surveying. Fitted shapes have been using for registration, alignment, georeferencing and monitoring for multi-temporal change detection applications. Robust matching with the same primitives are increasing the accuracy of alignment in addition the centre of the fitted primitives is being used to georeferencing point clouds from one frame to other reference frame. Furthermore, monitoring of reconstructed shapes determine the displacement of objects on monitoring site. The presented methodology is basically introducing of the three dimensional geometric shapes fitting with Random Sample Consensus (RANSAC) from three dimensional point clouds and application for monitoring change detection on landslide area. We show the performance of shape fitting a 3D circle, cylinder and plane to point clouds.

Keywords: point cloud; terrestrial laser scanning; geometric shape; fitting, RANSAC.

Proposed Nonparametric Tests for Mixed Design

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Abstract

When performing an experiment, researchers need to decide on the experimental design to be used. The researcher may start with one design structure. However they mostly may have to change the design structure because of some reason that money, run out of time, etc. It is also possible to have mixed design.

In this study, we propose test combinations for a mixed design experiment consisting of a combination of randomized complete block design and then completely randomized design. The proposed test combinations are designed for testing

$$H_0 : \tau_1 = \tau_2 = \ldots = \tau_t$$

$$H_1 : \tau_1 \leq \tau_2 \leq \ldots \leq \tau_t$$

at least one inequality is strict.

We are also suppose that the distributions being sampled from are unknown or that only rank data is available. Hence, we are considering nonparametric tests that Hollander (1967) and Jonckheere (1954)-Terpstra (1952). Magel and et. al. (2013) propose nonparametric test combinations that Page (1967) and Jonckheere-Terpstra for ordered alternatives in such a mixed design. For a similar design, Magel and Ndungu (2013) propose nonparametric test combinations consisting of Jonckheere-Terpstra and Alvo Cabilio (1995) tests.

In this study, two new test combinations propose a mixed design that consisting of randomized complete block design and completely randomized design for ordered alternatives. The proposed test combinations compared with the existing tests in terms of empirical type I error rates and power.

Keywords: Ordered Alternative; Mixed Design; Hollander Test; Jonckheere-Terpstra Test.

Maximum Lq-Likelihood Estimation for the Marshall-Olkin Extended Burr XII Distribution

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Abstract

Saiari et. al. (2014) extend the Burr XII distribution using the Marshall-Olkin transformation method to obtain more flexible distribution and called it as the Marshall-Olkin extended Burr XII (MOEBXII) distribution. They estimate the parameters of the MOEBXII distribution using the maximum likelihood (ML) estimation. In this work, as an alternative to the ML estimators, we will propose new estimators for the parameters of MOEBXII distribution using the Maximum Lq (MLq) estimation method. We will provide a small simulation study and some real data examples to compare the performance of MLq and the ML estimators.

Keywords: Marshall-Olkin extended Burr XII distribution; maximum likelihood estimation; Maximum Lq estimation.

Reference:

Saiari A.Y.,Baharirith L.A., Mousa S.A. (2014) "*Marshall-Olkin extended Burr XII distribution*", International Journal of Statistics and Probability,3 (1), 78-84.

On Queueing Systems with Priority Scheduling and a Numerical Example of M / M /1 System with Two Customer Classes

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Abstract

In certain queueing systems the customers are distinguished by customer classes. In such queueing systems it is very usual to designate priorities according to the comprehended importance of the customer. When the system contains customers of different classes, the customers of priority j are served before the customers of priority $j+1, j=1,2,\ldots$ Customers in each class are served in FCFS discipline. There are two scheduling policies how a customer in service will be treated when a higher-priority customer arrives to system. The first policy is the pre-emptive priority. In this case, a lower-priority customer in service is ejected from service at the moment a higher-priority customer arrives. The interrupted customer is allowed back when the system contains no customer having a higher-priority. The second policy is the non-pre-emptive priority.

In this paper, M / M / 1: Priority Queue with Two Customer Classes is analysed and the performance measures (the expected number of customer in system, the average waiting time in system) of M / M / 1: Priority Queue with Two Customer Classes are obtained using Little's Law, and a numerical example of this queueing system is given.

Keywords: Queueing systems, priority scheduling, performance measures, Little's Law.

Comparison of SHEWHART, CUSUM and EWMA quality control charts in an application

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Abstract

Nowadays, many methods for solution are being developed according to the needs in the full competition market. Organizations and institutions that aim to develop and renew themselves are closely interested in the concept of quality that has become dynamic in our day. Many companies who know the importance of statistical process control use control charts, which are important tools of quality, quite often. This study has been researched to reveal the practical differences of cumulative sum quality control charts (CUSUM) and exponentially weighted moving average control charts (EWMA), whose application area is rapidly increasing.

Impact of statistical process control of a company investigated with comparison of SHEWHART control charts, cumulative sum control chart (CUSUM) and exponentially weighted moving average (EWMA) charts. Results of this research showed the proper usage of these charts which used in small deviations in process average or for investigating the source of deviation in process average. Thus, practical information will be provided to the researchers and the practitioners in the companies.

Keywords: Statistical quality control; Control charts; SHEWHART; CUSUM; EWMA.

Estimation of the mean remaining strength of parallel systems in a stress-strength model based on exponential distribution

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Abstract

In this study, the estimation problem of the mean remaining strength (MRS) of the parallel systems in the stress-strength model is considered. The MRS of the system shows that this system on the average how long can be safe under the stress. The MRS of the system is defined by the conditional expected value of $X-Y|X>Y$ where X and Y represent the strength and stress components, respectively. In our case, the strength and stress components constitute parallel systems separately. For this model, the MRS and its estimations are obtained when the all components follow the exponential distribution. The simulation study is performed to compare the derived estimates and their results are presented.

Keywords: Stress-strength model; mean remaining strength; parallel system; exponential and generalized exponential distributions.

Comparison of Environmental Performance of Turkey and EU countries associated with Malmquist Index

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Abstract

Malmquist productivity index indicates the distance of the inputs under constant technology to the outputs to be obtained in a different time. Without putting any limitation on production technology, it makes efficiency measurement via linear programming method for inputs and outputs. Production curve is created for each input and output and production technologies are determined. Determined technology level gives the efficiency ratio.

Malmquist Index, which calculates movement at the production frontier, was developed by Fare, Grosskopf, Norris and Zhang (1994). The most important feature of Malmquist productivity index is that it explains the efficiency change and technological change for further decomposition of total factor productivity.

In this study, changes in the environmental performance of Turkey and the EU countries over the years were examined using the Data Envelopment Analysis (DEA) which is one of the nonparametric measurement methods. During the nine-year period covering 2006-2014, Turkey is tried to determine the position of its place among the EU countries and the Malmquist Total Factor Productivity Index and the changes in the efficiency scores of the countries over time were examined. Four different models are used for the purpose of examing the change of environmental performance of countries in years. For each model, the output variables are changed while the input variables are the same.

The model is named according to the output type. According to the results obtained, Belgium and Estonia are the best countries on average in terms of performance.

Keywords: Data envelopment analysis, Malmquist Index, environmental performance.

On Estimating the Regression Coefficients in Generalized Linear Models via a r-d Class Estimator

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Abstract

In order to combat multicollinearity, a new biased estimator called the r-d class estimator in the generalized linear models is introduced by combining principal components regression and Liu estimators which are proposed by Smith and Marx (1990) and Kurtoğlu and Özkale (2016), respectively. Since the estimation methods in generalized linear models are done iteratively by Newton-Raphson method, the r-d class estimator is an iterative estimator. Therefore, to calculate the mean squared error and to do comparisons, we propose the first-order approximated r-d class estimator. The choice of the shrinkage parameter is proposed via conceptual predictive criteria. Finally, a simulation study is done to compare the estimators.

Keywords: r-d class estimator; generalized linear models; gamma distribution; mean squared error.

Linear Unified Estimator in the Zero-Inflated Poisson Regression Model

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Abstract

When the dependent variable is in the form of counts with excess amounts of zeros, the-zero-inflated Poisson regression model is a popular method to model the data. Maximum likelihood estimation (MLE) technique is the common method to estimate the parameters of this model. However, the variance of MLE is inflated in the presence of multicollinearity problem. Therefore this study presents the linear unified estimator (LE) in the zero-inflated Poisson regression models to overcome the collinearity problem. A Monte Carlo simulation study is conducted to evaluate the performances of the estimators. According to the results of the simulation, LE has a better performance than MLE in the sense of scalar mean squared error criteria.

Keywords: Poisson regression, Linear unified estimator, zero inflated poisson regression, monte carlo simulation.

An application of ARMA type high order fuzzy time series forecast method based on fuzzy logic relation tables to TAIEX Data

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Abstract

Fuzzy AR (autoregressive) time series forecast models have been developed for a long time until now. However, many daily life time series have also contained both AR and MA (moving avarage) variables. For this reason, just using AR variables can cause the model specification error in AR type fuzzy forecast models for numerous daily life data. Some fuzzy ARMA (autoregressive moving average) time series models have proposed recently for abovementioned model specification error can be eliminated. One of fuzzy ARMA time series models is ARMA (p,q) type high order fuzzy time series forecast method based on fuzzy logic relations proposed by Kocak [1]. In this study, ARMA type fuzzy time forecast method proposed by Kocak [1] and some AR type fuzzy time series forecast methods have been solved for the Taiwan Stock Exchange Capitalization Weighted Stock Index (TAIEX) between 1999-2004 years and the statistical results obtained from these solutions have been discussed for comparing of the proposed method and fuzzy time series models in the literature. Thereby, advantages of the high order fuzzy ARMA type fuzzy time series have been indicated in comparison with the fuzzy AR type time series models in the literature.

Keywords: Fuzzy time series, autoregressive moving average fuzzy time series model, fuzzy ARMA type fuzzy time series forecast model, TAIEX time series.

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[1]Kocak C., "*ARMA(p,q) type high order fuzzy time series forecast method based on fuzzy logic relations*", *Applied Soft Computing*, DOI: 10.1016/j.asoc.2017.04.021, 2017. (Accepted Article)

Bootstrapped Robust Pi-Sigma Artificial Neural Network Based on Robust Learning Algorithm

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Abstract

Artificial neural networks are graphical models and they have been preferred for forecasting time series recent years. There are lots of artificial neural networks types for forecasting purpose in the literature. Pi-Sigma neural network is a high order network and it uses both of multiplicative and additive neuron models in its architecture. The pi-sigma artificial neural networks are badly affected by outliers because of multiplicative structure. In this study, bootstrapped robust pi-sigma artificial neural network based on robust learning algorithm is proposed. In the robust learning algorithm, particle swarm optimization is used and its fitness function is trimmed mean statistic. The bootstrap approach is subsampling approach in the proposed method. The proposed method is applied to real time series by injected outliers. The performance of the proposed method is compared in a statistical experimental study.

Key words: Artificial neural network, pi-sigma artificial neural network, forecasting, particle swarm optimization, subsampling bootstrap approach

Analysis of $M/Hypo_2/1$ Queueing System using Neuts' R Matrix

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Abstract

In queueing system the interarrival and service times are usually assumed as exponentially distributed. This case is named as birth-death process, but in real life this assumption is not valid in many queueing models. Hence, more general distributions can be determined with preserving the memoryless property of exponential distribution. These distributions are generally called as phase distributions and one of which is hypo-exponential distribution. When the squared coefficient variance of service time is less than 1, the hypo-exponential distribution can be used to model the service time.

In this paper a queueing model, in which arrivals are exponentially distributed with parameter λ and service time is hypo-exponentially distributed, is investigated. In this model a Markovian equality can be constructed for (k, i) pair that indicates the number of customer in system and the phase in which the customer is being served. Therefore, the transition rate matrix is in block tri-diagonal form. Neuts showed that, the sequential matrix R_l, which is obtained by using sub-matrices, is monotone increasing and converges to the matrix R. By using this R matrix, a numerical solution of the steady-state probabilities of the system and the measure of performances are obtained.

Keywords: Poisson arrival, tandem queueing model, Markov chain, phase-type distribution, transition probability.

Some New Separation Axioms for Soft b-open Sets

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Abstract

Firstly, we define the notions of *soft b-T_i* and *soft b-D_i* (for $i = 0,1,2$) *spaces*. Secondly, we obtain some properties and characterizations of them. Then, we introduce the notion of *soft b-irresolute function* by using *soft b-open sets*.

Finally, we investigate above some soft separation axioms whether preserving or not under *soft b-irresolute functions*.

Keywords: Soft open, Soft b-open, Soft bT_i-spaces, Soft bD_i-spaces.

Assessing Knowledge and Behaviour of Medicine Leaflet Use for University Students

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Abstract

Medicine information leaflets provide required information to the patient about the prescribed or non-prescribed medicines. This study aims to assess the attitude on when and how university students receive the information about a certain medicine. A survey is designed to identify usability of leaflets. 1st, 2nd, and 3rd grade undergraduate students are asked to answer 20 related questions and statistical analysis are conducted based on 90 responses. It is concluded that medicine leaflets are among the first information source of information. However, the size and design of the leaflets still needs to be improved.

Keywords: medicine information leaflets; usability; rational drug use.

Homogeneity and Trend Analysis of Beyşehir Precipitation Using Non-Parametric Methods

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Abstract

The effect of climate change on all atmospheric events is increasing day by day. One of the most important events observed in the atmosphere is precipitation. The determination of the change in the amount of precipitation is very important in the water resources management. This study focuses on detecting trends of precipitation data of Beyşehir station (No: 17896) in Beyşehir Lake Basin. For this aim, the precipitation data between 1960 and 2010 were taken into consideration. Trend analysis was performed by non-parametric Mann Kendall and Innovative Trend methods. The homogeneity of the data was examined using seven different homogeneity methods (Standard Normal Homogeneity, Buishand's range, Run, Mann Whitney U, Kruskal Wallis, Von Neumann Ratio, Pettitt). Homogeneity and trend analysis were carried out for precipitation data of monthly, annual and each month. As a result of, it is obtained that the precipitation data are generally homogeneous. In addition, Mann Kendall and Innovative Trend method results show a slightly increasing trend for precipitation data, although it is not statistically significant according to the 0.05 significance level.

Keywords: Mann-Kendall; Innovative Trend; Pettitt; Climate Change.

Frost Risk Premium Calculation Using Spatial Clustering

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Abstract

In agricultural insurance, risk premium can be calculated by using pre-determined coverage and estimated loss ratio for each locations or regions. In this study, we calculated risk premium for apricot products for frost risk in Turkey based on Spatial Clustering. We utilized the apricot product under the coverage of frost risk claim datasets from 2010 to 2014 in Turkey. By this purpose, we have to cluster locations where apricot production is made spatially. In agricultural insurance, premium must be collected fairly so the locations which has low frost loss ratios pays low frost premium and the locations which has higher loss ratios pays higher premium. We need to test this statement by using Moran's I test, Getis Ord Gi* Hot-Spot and Cold Spot Spatial Clustering approach. After the clustering stage, we calculated frost risk premium for each location.

Keywords: Spatial Clustering, Getis Ord Gi*, Morans' I, frost risk premium ,

Investigation of the Relationship between Economic Growth and Environmental Pollution in OECD Countries

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Abstract

One of the biggest problems of today's world is environmental pollution. Industrial development that started after the industrial revolution brought environmental pollution. Scientific work and awareness-raising actions in recent years have reached its goal in part, and have caught the attention of governments. Along with many definitions of environmental pollution in the literature, this study is based on air pollution, which is the most mentioned issue of recent periods. In describing air pollution, the greenhouse gas emissions to which the countries have passed are taken as reference.

In this study, the relationship between per capita GDP and Carbon dioxide emissions of the Organization for Economic Co-operation and Development (OECD) countries between 1994 and 2014 was analysed by panel data analysis. As a result of the analyses carried out, it is concluded that the increase in the level of economic prosperity has an effect on the amount of carbon emissions of the countries. In addition, it has been determined that there are long-lasting interactions between the gross domestic product per capita and carbon dioxide emissions as a result of the analyses made.

Key Words: Economic Growth, Environmental Pollution, OECD Countries, Panel Data Analysis

The analysis of different retirement decision models for defined contribution pension plans

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Abstract

There are two major types of pension plans which are defined benefit (DB) plans and defined contribution (DC) plans. In recent years, DC pension plans have become oft-used especially in the private sector. It has become crucial to determine retirement decision for DC pension plans. The objective of this study is to analyse and compare different retirement decision models for DC pension plans. One of these retirement decisions could be the two-thirds replacement ratio benchmark model which is widely accepted in many pension plans where DC plan participant sets a two-thirds replacement ratio target and exists the workforce when the target is achieved. Another decision could be determining a specific fund target value. Other decision models could be setting the pension benefit as a certain percentage of the income obtained for life or a certain amount payable monthly per year of service. For the purpose of analysing these retirement decisions a model is utilized. Decision variables are determined as the amount of contribution, fund target, investment strategy and retirement age for this model. In this study: the impact of decision variables on retirement decision models are examined. Furthermore, contribution amount, fund target, retirement age and optimal investment strategy are obtained to succeed retirement target for each retirement decision models.

Keywords: contribution amount; fund target; investment strategy; retirement age.

A Parametric Bootstrap Approach for the Equality of Two Regression Models under Heterogeneity of Error Variances

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Abstract

Testing equality of regression coefficients in linear regression models is a common problem encountered in many applied fields. The classical F test is used to test the equality of regression coefficients in linear regression models under homogeneity of error variances. However, when the error variances are not homogeneous, the type I error rates of F test are larger than the nominal level especially in small sample size. Therefore, various tests have been proposed for the equality of regression models under heterogeneity of error variances. The aim of this study is to present an alternative parametric bootstrap approach called computational approach test for of testing equality of regression coefficients in two linear regression models under heterogeneity of error variances. For this reason, some popular tests widely used in the literature are examined and the proposed approach is compared with the mentioned methods in terms of type I error and power of test by using Monte Carlo simulation. According to the simulation study, it is seen that the proposed approach is a good alternative to the existing tests in most considered cases.

Keywords: parametric bootstrap approach**,** heterogeneity of error variances, power

How inspection errors affect the performance of conditional sampling plan

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Abstract

Acceptance sampling plans have been widely utilized in manufacturing industry for inspection raw materials or final produced products. In most of plans, the decision criteria is only made based on current lot information. Unfortunately such plans need large sample size to make a decision criteria on sentencing the lot. Therefore, these sampling models cannot be an appropriate selection to apply in costly or destructive testing. In order to solve the mentioned problem, conditional sampling methods developed in which making the decision rule is based on the sample information taken from neighboring lots. Multiple deferred state (MDS) sampling plan, which belongs to the conditional sampling family, uses current lot information as well as future lots information. One of the usual assumptions to design MDS plan is that inspection is perfect and type I and type II inspection errors not occurred in the inspection process. But in practice, it is far from reality assuming the ideal inspection in each plan. In this paper, we develop MDS plan to the state where the inspection is not perfect. Also a specific case of MDS plan be more focused with some suitable examples to discuss the influence of inspection errors on the performance of it. The obtained results show that precision and performance of developed plan is under misclassification errors influence.

Keywords: acceptance sampling plan; multiple deferred state sampling plan; quality control; inspection errors.

A Comparison of Gudermannianboost Binary Classification Method and Logistic Regression Using Propensity Score

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Abstract

The purpose of this study is to compare a new boosting algorithm, GudermannianBoost, with logistic regression by using propensity scores and also the other cases that measure classification accuracy. Logistic regression is very handy method to classify observations. GudermannianBoost is a new boosting algorithm and it is robust to mislabeled observations near classifier in training dataset. The method is similar to LogitBoost algorithm. However, the main difference is that Gudermannian loss function ($\phi(v) = [2\,arcsin(tanh(v)) - 1]^2$) not only minimizes misclassification but also minimizes the distances from observations to classifier even if the observations are correctly classified. The method also produces propensity scores like binary logistic regression for each observations. The observations can be labelled and can also be compared to each other according to propensity scores. In this study, after a brief introduction to boosting algorithm, there is a small simulation study to compare classification accuracy of the methods. Moreover, there is a real dataset application in the presence of outlier-ridden datasets. All results from the simulation and application, it is clear that GudermannianBoost has better prediction properties than binary logistic regression.

Keywords: Robust Boosting; Binary Classification Method; Propensity Score

*Presenter

Bivariate Poisson-Laguerre Polynomial Model

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Abstract

Researches on count data regression models are mostly focused on univariate cases where a single dependent variable exists. Bivariate count data regression models handle the joint estimate two correlated count data series. The major drawback of mostly used bivariate count data models in the literature is that they do not allow for negative correlations between the count variables and, they accommodate only non-negative correlation between the counts. Some semiparametric estimation models in which dependence between count variables could be used through correlated unobserved heterogeneity components. This paper evaluates the performance of Bivariate Poisson-Laguerre Polynomial model which takes the negative correlation into account. A simulation study is performed under various correlation coefficients and sample size settings. The results show that Bivariate Poisson-Laguerre Polynomial model fits better than other bivariate count data models in the presence of negative correlation.

Key words: count data models, bivariate count data models, bivariate poisson-laguerre polynomail model.

On Goodness of fitness: Hybrid entropy

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Abstract

Entropy is a tool for measure of information. Hybrid entropy combines axiomatics of Renyi and Tsallis entropies which are generalization of Shannon entropy in classical derivative, which makes flexible the entropy. Goodness of fit test (GOFT) is essential for researches. In this direction, heavy-tailedness can be considered to be an important part for precise fitting, especially when the data set is considered to have outlier(s). The different tools, such as infiniteness of moment generating function etc, have been considered to determine the heavy-tailedness as a fitting performance of probability density functions for outlier(s). If there is an instability in phenomena, then the entropy values will be high. The hybrid entropy defined for the continuous case is considered to test whether or not a function is heavy-tailed. The hybrid entropy for some well known distributions is gotten. A parameter in t-distribution controls the heavy-tailedness. The values of hybrid entropy are high for the small values of a parameter in t-distribution if the parameter q in hybrid entropy is far from 1. The same result is obtained for the small values of shape-peakedness parameter of the exponential power distribution. Hybrid entropy can also be used as a tool to determine whether or not the functions are heavy-tailed. In this direction, when the explicit form of cumulative distribution function that is used in the goodness of fit test does not exist, the hybrid entropy can be used as an alternative tool for goodness of fit test as well for distributions.

Keywords: Generalized entropy; Information theory.

I-Prime Elements

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Abstract

Let R is a Unique Factorization Domain (UFD) and I is a nonzero ideal in R and $k := \gcd(I) \neq 0$. Let $\theta_I : R \to R/I$ be the natural epimorphism. It is denoted the image of a $b \in R$ under the θ_I epimorphism with $\hat{b} \in R/I$. An I −pre-image of $\hat{b} \in R/I$ is a production of two parts in R such that $r\delta$. r is named with relative prime part and δ is named with divisor part of $r\delta$ where $\gcd(r, k) = 1$ and $\delta \mid k$ (Marais, 2014). If a r divisor part of a $\hat{b} \in R/I$ is become prime in R, $\hat{b} \in R/I$ is named with I −prime element. The irreducibility in factor rings with zero divisors is a hard matter. So that the concept I −prime element can help to the solving this problem in factor rings with zero divisors.

Keywords: I −prime element; Unique Factorization Domain; irreducibility; zero divisors.

References:

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Recurrent Fuzzy Functions Approach Based on Grey Wolf Optimizer for Time Series Forecasting

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Abstract

There have been many efforts to improve time series forecasts in terms of alternative methods in the recent literature. Among those alternative methods fuzzy time series methods one of the most studied topics because it successfully deals with forecasting problems. A fuzzy set based approach introduced in the paper to improve forecasting results. The proposed method combines the type-1 fuzzy functions approach with the autoregressive moving average model. To estimate the coefficients of the model, the grey wolf optimizer (GWO) is preferred to minimize the sum of squared error. In the previous study, particle swarm optimization (PSO) was chosen to minimize the objective function. However, because disturbance terms for moving average part of the proposed algorithm was calculated observation by observation, PSO is not as efficient as GWO. The main advantage of GWO for the proposed method that it is possible to get better outcomes with less iterations along with better forecasting results. The input matrix organized with lagged values of the time series, the lagged values of the disturbances and the degrees of memberships. To evaluate the performance of the proposed method, several real world time series datasets are used. Evaluations show that the proposed method performs better most of the time in terms of root mean squared errors.

Keywords: Type-1 Fuzzy Functions; Grey Wolf Optimizer; Autoregressive Moving Average; Forecasting.

The Profile Likelihood Ratio Method for Testing the Equality of Several Log-Normal Means

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Abstract

The log-normal distribution is a member of continuous probability distributions family that is used for modeling positive and right-skewed data. It has many applications in many fields such as biology, medicine, chemistry, economics, and human behavior researches. A very common problem in applied statistics is to compare the means of several log-normal distributions. By using log-transformation version of data the classical ANOVA F-test can be used for this problem. However, the classical ANOVA F-test has high type I error rate when the variances of groups are not equal. Recently, many researchers proposed a lot of methods for this problem. In this study, we proposed some tests based on the profile likelihood ratio test for comparing the means of several log-normal distributions. In simulation study, we compared the proposed approach with the existing methods for various values of number of groups and sample sizes. Numerical results show that the proposed method performs quite well against the other methods in terms of the estimated type I error rate and power.

Keywords: lognormal distribution; profile likelihood ratio test; restricted maximum likelihood.

Effects of different parameter estimators to error rate in discriminant analysis

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Abstract

Discriminant analysis is defined as a statistical technique that assign a unit to one of known finite number of populations based on a set of measurements. In this assignment process, an error occurs when the unit is assigned to different population from its own population. This error is called the error rate or the probability of incorrect classification. It is desired to perform the assignments with a minimum number of errors in discriminant analysis. In this study, the problem of discriminant analysis is discussed between two populations with Weibull distribution. A simulation study is performed to display the error rate performance of the obtained discriminant function in the case of the parameters are unknown. The main goal of simulation study is find out the error rate how is affected by the different parameter estimators which are maximum likelihood (ML), modified maximum likelihood (MML), method of moments (MOM) and least square (LS).

Keywords: Weibull distribution; probability of incorrect classification; optimal classification.

Analysis of Alcohol Consumption Determinants in Turkey with Multinomial Probit Model

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Abstract

The protection of the health of populations by preventing and reducing the harmful use of alcohol is one of the main objectives of the governments. The aim of this study is to examine the socio-economic determinants of alcohol consumption among adult individuals in Turkey. For this purpose, data from the Turkey Health Survey conducted in 2010 and 2012 by the Turkish Statistical Institute were used. The questionnaire was applied to a total of 42502 people, of which 23290 were women and 19212 were over 15 years of age. A multinomial probit regression model was used to determine the factors affecting the likelihood of consuming alcohol. According to the results obtained from the model, gender, age, income, frequency of tobacco use and showing tendency to violence were found to be related to the likelihood of frequent alcohol consumption. These kinds of studies carried out by taking into account the socio-economic situation of individuals may be important in terms of providing support to governments in forming anti-alcohol politics.

Keywords: Alcohol consumption, Multinomial probit models, Turkey Health Survey

Determining of Basic Factors Affecting Successful Tobacco Cessation

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Abstract

Tobacco use is also accepted as a global health issue as well as being an important public health problem. Tobacco use is seen as a factor threatening the health of individual, cause illness and death. Most users know the harm of tobacco. Therefore they want to quit, but this stage is difficult because of the nicotine. Quitting of tobacco use depends on their desire and will like most of the substance abuse. Individuals can quit tobacco use on their own but encounter some difficulties in their attempts to quit. People begin to smoke cigarettes or other tobacco products with the influence of social, psychological and pharmacological factors, and they continue to use it. Sustainability of quitting in the method followed by the individual's self-monitoring is very difficult and in these cases it is usual for individuals to start again. In most of the studies on tobacco use cessation results regarding of quitting will be easier with social support and encouragement by its own will are obtained. Many studies indicate that tobacco use is associated with demographic and socio-economic variables such as gender, age, education, occupation, place of residence, race, marital status, geographic region, income, health issues, information based on the harmful effects of tobacco, tobacco control policies, taxes applied to tobacco. To resume tobacco use is seen widely after quitting. There is a connection between the factors associated with the use of tobacco and starting re-use tobacco of individuals. The purpose of this study is to determine the demographic, social and economic factors which are effective in individuals who start using tobacco again after quitting tobacco use. In this study, it is being planned to benefit from the study named "Global Adult Tobacco Survey" Turkey Statistical Institute in 2012. Logistic regression analysis which are used the most commonly will be used to examine the duration of stop and using tobacco again and the demographic and socio-economic factors that affect the duration in the study.

Keywords: tobacco reuse, logistic regression, global health issue

*Presenter

SELÇUK ÜNİVERSİTESİ

Credit Scoring by Artificial Neural Networks based Cross-Entropy and Fuzzy Relations

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Abstract

The credit scoring is one of the major activities in the banking sector. Because of growing market and increasing the loan applications, this field still continues its concern in terms of evaluating the applicants and credit amounts accurately. In context of decreasing evaluation errors and potential practical implications, the decision makers need more robust models. The fact that the traditional methods are criticized due to various prerequisites and their linear approximations even the excessive nonlinear cases. In such cases, Artificial Neural Networks (ANNs) provide a flexible way to handle the credit scoring problems. This study presents the efficient procedure based on ANNs with cross-entropy and fuzzy relations. In the implementations, the proposed procedure is applied to a couple of benchmark credit scoring data sets and its performance is compared with traditional approaches.

Keywords: Credit Scoring, Artificial Neural Networks, Fuzzy Relations, Cross-entropy, Gradient based Algorithms.

SELÇUK ÜNİVERSİTESİ

Efficiency Measurement of Turkish Natural Gas Distribution Companies by Using Stochastic Frontier Analysis

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Abstract

In this study, technical efficiencies of 55 natural gas distribution companies in Turkey during 2013 and 2015 has been examined. Energy Market Regulatory Authority (EPDK) determines tariffs carried out by distribution companies (DCs) operating in a regulated market. DCs are incented to work efficiently by reducing costs by means of price cap method that is popular type of incentive regulation. In this context, two Stochastic Frontier Analysis models have been used for measuring of technical efficiencies of DCs. First of these models is Battese and Coelli (1992) and the other is Battese and Coelli (1995). For these models, operating expense as an input and number of total consumers and total consumption amount as outputs have been determined. Additionally, ratio of total number of consumers to total consumption amount have been added as environmental factor to second model. Thus, it has been aimed to evaluate effects of industry and household oriented consumption amount equally. Panel data containing 2013, 2014 and 2015 have been used for measuring technical efficiencies of companies. When examined the results of models, the elasticities of outputs are statistically significant and have the expected signs i.e. negative, thus it has been evaluated that results are satisfactory. In the first model, parameter eta (η) has been estimated 0,084, which means the model is time variant and there is positive change through the time, and parameter gamma (γ) has been estimated 0,91, which means that 91% of composed error term is originated technical inefficiency and the rest is originated statistical noises. Besides, in the second model, parameter γ has been estimated 0,88. As for efficiency estimations of alternative models, for first model, average efficiencies of DCs for 2013, 2014 and 2015 has been estimated as 77,1%, 78,56% and 79,95% and similarly as 77,75%, 78,84% and 79,63% for second model respectively. It has been observed that efficiencies of some companies has changed as expected, although the average efficiency values of both models have not changed. Moreover, it has been also observed that efficiency scores of DCs operating in distribution region where industry dominated consumption in total has decreased and distribution region where household dominated consumption in total has increased.

Keywords: Technical Efficiency, Turkish Natural Gas Distribution Sector, Stochastic Frontier Analysis

*Presenter

SELÇUK ÜNİVERSİTESİ

Extracting Clusters between Turkey's Cities Based on Human Development Index: A Comparison of Clustering Methods

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Abstract

Assessing development of countries and cities has long been a question of great interest. Therefore, determining factors that effect on development plays key role. Although there is still uncertainty, Health Index (HI), Income Index (INI), Education Index (EI) and Human Development Index (HDI) are the variables that can be used as factors to determine the development levels. The primary aim of this study was to develop a better understanding of development levels of the cities in Turkey. Hierarchical Clustering Methods, k-means and Partitioning Around Medoids Method (PAM) have been employed on a data set to capture this aim. Many indices like CH (Calinski and Harabasz, 1974), Duda (Duda and Hart, 1973), DB (Davies and Bouldin, 1967), Hartigan (Hartigan, 1975), Marriot (Marriot, 1971), Friedman (Friedman and Rubin, 1967), KL (Krzanowski and Lai, 1988), Silhouette (Rousseeuw, 1987), GAP (Tibshirani et al., 2001) and 17 more are used to choose the number of clusters. Dendrogram and Clustergram plots added for visual comparison of clusters. According to the results of all three clustering methods and validity indices values, there are two distinct clusters between Turkey's cities. Unsurprisingly, the first cluster consists of İstanbul, İzmir, Kocaeli and Ankara cities and all the rest creates the second one. As a conclusion, the findings of this research may provide insights while taking some decisions to develop the cities having low scores and positions.

Keywords: clustering; k-means, cluster validity, hierarchical clustering; partitioning around medoids; human development index

A bonus-malus system design using generalized linear model

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Abstract

In actuarial studies, bonus-malus system is used to determine a fair premium for vehicle insurance according to claim frequencies of policyholders. In pricing of insurance, discrimination of good and bad drivers can be done by the bonus-malus system. Using an optimal bonus-malus system in the pricing of insurance is important for a fair premium for both insured and insurer. Claim history of the insured should be known for use the bonus-malus system. Generalized Linear Model (GLM) which is widely used in actuarial studies such as premium calculation, credibility, non-life insurance reserve and mortality can be also used to estimate the claim history of the insured for the bonus-malus system. In Turkey, motor-third-party-liability insurance is priced freely according to official regulations after 2014. Therefore using a correct bonus-malus system which fairly distributes the burden of claims among individuals become more important for Turkish policyholders and insurance companies. In this study, a bonus-malus system is re-designed by using GLM. Moreover, it is aimed to calculate a fair premium for vehicle insurance using the bonus-malus system.

Keywords: bonus-malus system; generalized linear model; fair premium; insurance.

Evaluation of the Gaussian Mixture Model and non-Gaussian Mixture Model in the Manufacturing Systems via Discrete Event Simulation

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Abstract

Mixture models have been widely used in many areas such as finance, hydrology, medical science, psychology over the last few decades. In this study, we developed a discrete event system simulation model to evaluate the performance of mixture models performance in the manufacturing systems. We examined the mix models performance from single phase, single channel manufacturing systems to multiphase, multichannel manufacturing systems. The simulated results were compared to queuing theory results. Analysis showed that Gaussian Mixture Model (GMM) results are very close to queuing theory results especially at the single phase systems but using the non-GMM based on Expectation Maximation (EM) algorithm have the poor results when compared with queuing theory results especially in the multiphase multichannel manufacturing systems including feedback.

Keywords: Gauss Mixture Distribution; Expectation Maximation; manufacturing system; queuing theory.

Improved Estimation Strategies in Quantile Regression Model when Errors are Non-iid

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Abstract

In a classical regression model, it is usually assumed that the explanatory variables are independent of each other and error terms are normally distributed. But when these assumptions are not met, situations like the error terms are not independent or they are not identically distributed or both of these, LSE will not robust. Hence, quantile regression has been used to complement this deficiency of classical regression analysis and to improve the least square estimation (LSE). In this study, we consider preliminary test and shrinkage estimation strategies for quantile regression models with iid errors. A Monte Carlo simulation study is conducted to assess the relative performance of the estimators. Also, we numerically compare their performance with Ridge, Lasso, Elastic Net penalty estimation strategies. A real data example is presented to illustrate the usefulness of the suggested methods. Finally, we obtain the asymptotic results of suggested estimators.

Keywords: Shrinkage estimation, Penalty Estimation, Robust Estimation, Multiple Regression Model.

Some Properties of Fuzzy Normed Spaces

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Absract

The concept of fuzzy set was discovered by Zadeh and one of its earliest branches, the theory of fuzzy topology, was developed by Chang and others. Cheng and Morderson introduced concept of fuzzy norm.In this study ; some properties of this fuzzy normed spaces are investigated by defining fuzzy normed spaces on vector spaces. After,the connections between normed spaces and fuzzy normed spaces are discussed. Furthermore,some mappings between fuzzy normed spaces are given and some properties of this mappings are searched.

Keywords: normed spaces, fuzzy norm, fuzzy normed spaces, fuzzy linear mapping

Improved Estimation Strategies in Generalized Ridge Regression Models

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Abstract

In this study, we introduce a number of shrinkage estimations based on generalized ridge regression (GRR) under Low and High Dimensional regimes. Shrinkage estimations are very common in literature since it control the bias of parameter and more efficient than classical estimators. Also, the GRR method, which is the general form of ridge regression, has powerful performance since it use different tuning parameters instead of one. Hence, we combine the idea of shrinkage and GRR in order to improve its efficiency. To this end, a Monte Carlo simulation study first is conducted to assess the relative performance of the listed estimators. Also, we numerically compare their performance with penalty estimations, namely Ridge, Lasso, Adaptive Lasso, SCAD, MCP, Elastic Net, Mnet, under different scenarios. Further, two real data examples are presented to illustrate the usefulness of the suggested methods. According to the numerical results, it is shown that the proposed estimators outshine classical least squares and the listed penalty estimator in most cases. Finally, we obtain the theoretical results of suggested estimators.

Keywords: Penalty Estimation; Shrinkage Estimation; Low and High Dimensional Data; Multicollinearity.

Controlling Bias in Quantile Regression Models under Gauss-Markov Assumptions

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Abstract

In this study, we consider preliminary test and shrinkage estimation strategies for quantile regression models. In classical Ordinary Least Squares (OLS) method, the relationship between the explanatory and explained variables in the coordinate plane is estimated with a mean regression line. In order to use OLS estimator, there are three assumptions on the error terms showing white noise process of the regression model, also known as Gauss-Markov Assumptions, must be met: (1) The error terms have zero mean, (2) The variance of the error terms is constant and (3) The covariance between the errors is zero i.e., there is no autocorrelation. However, data in many areas, including econometrics, survival analysis and ecology, etc. doesn't provide these assumptions. First introduced by Koenker, quantile regression has been used to complement this deficiency of classical regression analysis and to improve the least square estimation. The aim of this study is to improve the performance of quantile regression estimators by using pre-test and shrinkage strategies. A Monte Carlo simulation study including a comparison with L_1type estimators such as Lasso, Ridge and Elastic Net are designed to evaluate the performances of the estimators. A real data example is given for illustrative purposes. Finally, we obtain the asymptotic results of suggested estimators.

Keywords: Shrinkage estimation, Penalty Estimation, Robust Estimation, Multiple Regression Model

A New Distribution Function Estimation Method by Using Non-Uniform Rational B-splines

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Abstract

One of the fundamental aspects of statistical inference is estimation underlying cumulative distribution function of population. Nonparametric smoothing methods are a useful tool for estimating the cumulative distribution function of the underlying population. In this study, we propose a new method to estimate the distribution function using Non-uniform rational B-splines (NURBS). The proposed method guarantees monotone nondecreasing function by applying linear constraints on the coefficients of the rational B-spline basis functions and smooth the empirical distribution function. We compared this method with B-Splines and empirical distribution function in a simulation study.

Keywords: Non-uniform rational B-splines, knot, distribution function estimation, nonparametric methods.

Automaticity for Some Algebraic Structures

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Abstract

Automata theory is the study of abstract computing devices, or "machines". Before there were computers, in the 1930's, Alan Turing studied an abstract machine that had all the capabilities of today's computers. Turing's goal was to describe precisely the boundary between what a computing machine could do and what it could not do. Turing's conclusions apply not only to his abstract *Turing machines,* but to today's real machines (Hopcroft, et al., 2000). In this talk, firstly, I will give some basic information about automata theory and automaticity. Then, I will present some results on automatic structure for some semigroup constructions; namely free, direct product of semigroups (Campbell, et al. 2001) and generalized Bruck-Reilly *-extension of a monoid (Karpuz, et al.).

Keywords: automatic structure; presentation; generalized Bruck-Reilly *-extension

Exponential Estimators of Population Mean using Stratified Ranked Set Sampling

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Abstract

Ranked set sampling is an effective sampling design according to its counterparts. This sampling scheme takes into account the ranking of units. Stratification is also an important tool to get efficiency in sampling literature. In this paper we have examined exponential estimators in stratified ranked set sampling. We have investigated the performance of exponential estimators in stratified ranked set sampling and compared with stratified random sampling design. We use the data concerning body mass index as a study variable and the age as auxiliary variable for 800 people in Turkey in 2014. We stratified the data set using gender. We have used this data set to see the properties of estimators.

Keywords: stratified random sampling; stratified ranked set sampling; efficiency.

Mixture Cluster Analysis based on Mixture of Elliptical Gamma Distributions

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Abstract

Finite mixture models are currently a very popular in clustering analysis based on modeling. In the mixture cluster analysis, each cluster is mathematically represented by a parametric distribution. Developments in the area of mixture cluster analysis are mostly concentrated on mixtures of multivariate normal. In this study, we explain mixture cluster analysis based on mixture of elliptical Gamma distributions. We define an Expectation Maximization (EM) algorithm for maximum likelihood estimators of the model parameters in the mixture of elliptical Gamma distributions. Also, the real data sets are given to show the clustering performance of the mixture of elliptical Gamma distributions.

Keywords: cluster analysis; mixture models; elliptical gamma distribution.

Demand Forecasting Methods in a University Campus Dining Hall

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Abstract

In university campuses, cost and customer satisfaction are important factors depending on how many people eat and how much food was prepared each day in the dining halls. Therefore, correct estimation of the number of students and staff who come for eating each day is beneficial to avoid food waste and customer satisfaction. In this study, it is aimed to investigate the past data of the dining hall of a campus, to use different demand forecasting methods, and to compare the performances of the forecasting methods. Artificial neural networks, time series models, and linear regression models are constructed and their prediction performances are compared.

Keywords: food service; time series analysis; linear regression models; artificial neural networks.

Analysis of an Online Shopping Problem

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Abstract

In this study, we analyse an online shopping problem that is very common. Generally, the customers have a list of items that they want to buy on an online shopping website where there are several suppliers. On the other hand it turns out that the items have variable prices for different suppliers. If there is no shipping cost then the optimal solution for the customer is buying each item from the lowest price supplier. However, when there is a shipping cost for each supplier then finding the optimal purchase plan is not easy. In fact this problem is similar to set-covering or facility-location problems that are very popular in operations research literature. We give an integer programming model for this shopping problem and then discuss alternative solution methods and strategies.

Keywords: Internet shopping, integer programming, optimization, set covering problem

Evaluation of the Logistic Performance Index by Using Multi-Criteria Decision Making Methods

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Abstract

In a rapidly changing global competitive environment, companies have tried to provide faster and more efficient services in order to survive in developed markets and to provide customer satisfaction. In today's market conditions, the competitiveness of firms is largely due to their cost advantages, the success of the goods in the shortest time, and customer satisfaction. Therefore, the importance of logistics have increased day by day. Logistics is also very important in international commercial relations. The logistics performance index (LPI) produced by the World Bank's International Trade Department, has been published every two years since 2007. LPI is computed by using Principal Component analysis to measure the logistic performance of countries according to six indicators which are customs, infrastructure, international shipments, logistic quality and competence, tracking&tracing and timeliness.

The aim of this study is to obtain LPI rankings of the countries using various Multiple Criteria Decision Making (MCDM) methods and to perform a comparative analysis.

Keywords: Simple Additive Weighting, WASPAS, WSM, WPM.

Obtaining Point Estimates of Nonlinear Regression Model Parameters by Hybridization of Iterative and Direct Optimization Algorithms

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Abstract

One of the main stage to the solution of a real world problem is development of a proper functional relationship between a response of interest and number of concerned input variables. Mostly, such a relationship is intrinsically nonlinear in the model parameters which means that at least one of the derivatives of the response function with respect to the parameters depends on at least one of the model parameters. In nonlinear regression models, a common used point estimation approach is minimization of sum of squared errors. The minimization have been achieved iteratively and directly by using derivative based and non-derivative based optimization algorithms so far. In this study, it is aimed to present the applicability of hybrid algorithms which are composed by iterative and direct optimization methods to obtain the point estimates of model parameters. Also, selection of proper tuning parameters of optimization algorithms are defined. Some benchmark data sets are used for application purpose and the obtained results are discussed.

Keywords: Nonlinear regression; point estimation; iterative optimization algorithms; direct optimization algorithms; hybrid algorithms.

An Application of Survival Models in Motor Insurance

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Abstract

The motor insurance market has a high potential in Turkey. This work is a case study to highlight a possible application of survival analysis: continuous and discrete survival models on motor insurance. We particularly study the nonparametric, semi-parametric, parametric and also discrete survival models. In this study a motor insurance data of a private Turkish insurance company is used. We employ age, sex, region and age of automobile as covariates in the model where we use non-claim discount level as survival time. According to the results of all models, the covariates are found statistically significant. The effects of different survival models are discussed.

Keywords: Claim; motor insurance; survival models.

Evaluation of Meteorological Parameters Homogeneity and Trends in Salihli (Turkey)

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Abstract

Global warming and climate change are the most important environmental issues in recent years. This problem has been the subject of many researches especially during the last few decades. In this study, the annual meteorological parameters of Salihli meteorology station (Station Number: 17792) were used for homogeneity and trend analysis. The meteorological data used included the total precipitation, max precipitation, total evaporation, temperature (min, max and average), relative humidity and wind speed as annual. Von Neumann, Pettitt, Mann Whitney tests were used for homogeneity analysis. According to the homogeneity tests, it was determined that the data except humidity, wind speed and average temperature are homogenous. Sen's T and Mann-Kendall rank correlation methods were used for trend analysis. These tests were examined according to the significance level 0.05. Non-meaningful decreasing trends were observed in relative humidity, wind speed and minimum temperature data, while precipitation (total and maximum), maximum temperature and total evaporation data revealed non-meaningful increasing trends in Salihli station. Annual average temperature data show significance increase trend as statistically according to the significance level 0.05.

Keywords: Sen's T, Mann-Kendall Rank Correlation; Global Warming; Climate Change.

On Ridge Parameter Estimators for Generalized Linear Models: Simulation Study on Gamma Response Variable

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Abstract

This study introduces ridge parameter estimators for the first-order approximated ridge estimation with gamma response in generalized linear model. These new estimation methods are suggested since the mean squared error (MSE) of the commonly used maximum likelihood (ML) method becomes inflated when the explanatory variables of the model are highly correlated. To investigate the performance of the first-order approximated ridge estimator for all proposed ridge parameter estimators, the estimated approximated MSE is calculated using Monte Carlo simulations. Then, the comparison of the first-order approximated ridge and ML estimators indicates that the estimated approximated MSE is lower for the first-order approximated ridge estimators than those of the first-order approximated ML in the presence of multicollinearity under all configurations.

Keywords: ridge estimator; generalized linear models; gamma distribution; mean squared error.

On Evaluation of Divergences for Heavy Tailed Distributions

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Abstract

Divergence or relative entropy can be used to test the dissimilarity between two functions. In statistical theory, the probability density functions are used to fit the data set. It is well known that the minimization of Kullback-Leibler (KL) divergence is equivalent to maximization of log-likelihood function. In this direction, estimating parameters efficiently is crucial. In this paper, the exponential power distribution, its epsilon-skew form, its heavy-tailed form and heavy-tailed distributions on the positive axis, such as Burr III distribution, etc are considered to test the dissimilarity for the different values of parameters for aforementioned distributions. The sampling version (small disturbing) of a function is a neighborhood of true values of parameters. Then, we will not only evaluate performance and behaviour of KL divergence for the different values of parameters but also other divergences such as, Jeffrey-divergence, etc will be considered to test their evaluation performances on dissimilarity occurred by extremely small disturbing on the values of parameters. The evaluation of KL is also examined for the simultaneous disturbing case of parameters. The values of KL divergence are symmetric around zero for skewness parameter with small disturbing, however the other parameters with extremely small disturbing are around zero. Thus, the sensitivity of divergences for extremely small disturbing values of parameters has been tested via calculated divergences.

Keywords: Estimation theory; Information theory.

SELÇUK ÜNİVERSİTESİ

Improving the fit of Archimedean Copulas based on λ-functions

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Abstract

In dependence modelling, the selection of copulas is an important stage from many perspectives through the analysis of multivariate data. Many studies have proposed some methods that allow the multivariate data to choose the appropriate copula model. Some goodness-of-fit tests (GoF) have been studied for the model selection. However, these procedures do not always lead to the best possible fit. In this paper, we study on a method for improving the goodness-of-fit of Archimedean copulas using concordance invariant transforms which preserves the tail dependency based on λ-function. Also, this method allows to construct multi-parameter copula family to manage the best fit of the data. The methodology is applied on the energy data including monthly energy consumption and monthly carbon dioxide (CO_2) emission quantities. The total amount of carbon dioxide emission (TCDE) and total energy consumption (TEC) are examined according to sectoral areas, Residential, Industrial, Commercial and Electric Power using Kendall tau and tail dependence preserving transformation.

Keywords: Copula; Archimedean; Kendall Tau; Tail Dependence.

Diagnosis of Breast Cancer with Machine Learning Classification Methods

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Abstract

In the medical fields, the data mining approach has been widely used in recent years in order to make more accurate prediction of disease diagnosis by avoiding unnecessary methods and to help medical practitioners make decisions more quickly. Being able to make easy diagnosis, more accurate prediction and avoiding unnecessary biopsyas would enable to have better outcomes of diseases, as well as reducing the cost of unnecessary methods and allows for increased clinical trials.
The breast cancer is the highest mortality rate in women after lung cancer. The purpose of this study is to investigate early detection of breast cancer by machine learning methods, avoiding unnecessary biopsy. In previous studies, while variables including tumor information were used for diagnosis, in this study, variables that were mostly cultural and physical influences were used. In early diagnosis, it was investigated whether these variables were important or not, and it was also compared with studies done with different variables. Breast cancer diagnosis have been used for Machine Learning Classification Methods. Each method has its own size reduction in the variables according to the suitability of the method. The most effective variable according to each method is varied. Artificial neural networks and support vector machines provided the best result of the machine learning methods used. After that, the following methods would be Bayesian network, least squares support vector machines, logistic regression, C5.0 algorithm in decision trees and k.

Key Words: Machine Learning, Logistic Regression, Support Vector Machines, Decision Trees, Artificial Neural Networks

SELÇUK ÜNİVERSİTESİ

Comparison of patella morphology in patients with chondromalacia, meniscopathy and in healthy Individuals

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Abstract

Patella, the largest sesamoid bone in the body, locates in m. quadriceps femoris tendon. It protects the knee joint from external influences and provides biomechanical advantage by increasing the moment arm of patellar tendon. Morphological and morphometric parameters of the patella in healthy people and in individuals with chondromalacia or meniscopathy examined in this study and it was aimed to determine whether there were statistical differences between the groups. A total of 303 patients' MRI (136 male, 167 female) were evaluated retrospectively in this study that consist of patients with chondromalacia and meniscopathy diagnosed by radiologists between 2013 and 2015 at Selcuk University Medical Faculty Radiology Department and healthy individuals' knee MRIs without any pathological findings. These cases were studied in 3 groups; chondromalacia group (101 patients), meniscopathy group (101 patients), and healthy individual group (101 patients). Patella type and patella localization were determined according to age, sex and lateralization in the groups. Patellar diameters measured (anterior-posterior, transvers, caudal). Classifications in literature were used in determining grades of chondromalacia and meniscopathy and in patella types. Obtained datas were analyzed using SPSS (Statistical Package for Social Sciences) packet program. As a result of study, meniscopathy diagnosis was more frequent in patients with type 1 and type 2 patella. There was no significant difference between the groups in terms of patella localization ($p>0,05$). There was no significant difference between groups in right and left knee seperation ($p>0,05$). The transverse diameter of patella was found to be higher in patients with meniscopathy than in chondromalacia and healthy individuals ($p<0,05$). Anterior-posterior diameter and cranio-caudal diameter lengths were found to be higher in patients with meniscopathy than those with chondromalacia.

We think that obtained results will help the anatomists, radiologists and surgeons dealing with region to understand the patellar morphology and its changes. Besides, new studies will reveal the importance of the patella in other pathologies in the knee joint.

Key Words: Patella, chondromalacia, meniscopathy, magnetic resonance imaging

*Presenter

Application of MARS for Modeling the Lactation Curves

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Abstract

The aim of this study is to model milk yield by the Multivariate Adaptive Regression Splines (MARS) method using independent variables such as test day, milking time, conductivity and mobility. MARS is a non-parametric method for predicting linear sub-models to determine appropriate knot points of non-linear models. With the help of MARS model, nonlinear relations between variables examined and interpreted.

This study included daily lactation records for 80 Holstein cows between 2006 and 2011. For each lactation, the most suitable model was determined by testing different maximum interaction models. The model suitability is generally assessed by the criteria that generalized cross-validation criterion (GCV) minimum and R^2 maximum values. The best models are: For the first lactation is non-interactive; 11 basis functions, GCV value 0.10633, R^2 value 0.983 and independent variables entering the model are control day, mobility, milking time ordered their importance levels. For the second lactation, non-interactive; 12 basis functions, GCV value 0.17224, R^2 value 0.991 and independent variables entering the model are control day, mobility, and milking time ordered their importance levels. For the third lactation, non-interactive; 11 basis functions, GCV value 0.34663, R^2 value 0.991 and independent variables entering the model are control day, mobility, and conductivity ordered their importance levels. The fourth lactation, non-interactive; 10 basis functions, GCV value 0.67783, R^2 value 0.975 and independent variables entering the model are control day, mobility, and milking time ordered their importance levels. The fifth lactation, 3 interacting; 14 basis functions, GCV value 1.40751, R^2 value 0.950 and independent variables entering the model are control day, conductivity, mobility, and milking time ordered their importance levels. All the independent variable coefficients in models were found to be important at 99% level.

In all models, MARS has been identified as the most meaningful variable of control day. According to these results, we can say that the estimation of milk yield of models produced by MARS is successful and safe.

Keywords: Non-Parametric Regression, Dairy Cattle, Milk Yield

*Presenter

SELÇUK ÜNİVERSİTESİ

Applicability of MARS Method Using Saliva Oxidative Stress Parameters in Detecting Periodontal Disease

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Abstract

In this study, the use of Multivariate Adaptive Regression Splines (MARS) model for periodontal disease (gum disease) was evaluated using saliva parameters of FMF patients and systemic healthy controls. MARS was developed by Jerome H. Friedman in 1991 for regression modeling of multivariate data. MARS, which is a nonparametric regression method, models the effect of independent variables on dependent variables. This method is reported to give effective estimates even in complex structures by establishing basic functions according to the interactions between multidimensional data. Mars model;

$$\hat{f}(x) = B_0 + \sum_{i=1}^{K} a_i . B_i(x)$$

Where B_0 is the constant term, B_i is the basic functions, and a_i is the coefficients of the basic functions (Friedman, 1991).

The use of saliva parameters in the diagnosis of periodontal disease has been investigated. The studied saliva parameters are TAS (Total Antioxidant Level), TOS (Total Oxidant Level), 8OHDG (8-Hydroxy-Deoxyguanosine), MDA (Malondialdehyde). Using these predictive variables, a MARS model was estimated that can predict whether patients have chronic periodontitis or Periodontal healthy. In this model, the most appropriate model was determined by testing different maximum basic functions for each maximum interaction. When the maximum number of interactions increases to 4, the generalized Cross-Validation Criterion (GCV) is the minimum and the R^2 and the corrected R^2 values are the maximum values. The obtained best model (10 basic functions and 4 interactions) statistics found to be; GCV: 0.1283, R^2: 0.661 and corrected R^2: 0.640. The independent variables included in the model were TAS (100%), FMF (84.5%), 8OHDG (63.64%), TOS (54.51%) and MDA (48.11%). The area under the ROC curve is 97%. It could be said that accurate of the model estimate is 97%. In addition, the accuracy rate of model was found as 90.8% whether patients had chronic periodontitis or Periodontal healthy.

Keywords: Modeling, non-parametric regression, chronic Periodontitis, Periodontal healthy

*Presenter

Effect of Sample Size on Significance Levels of the Correlation Coefficient

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Abstract

The correlation coefficient (r), which is the measure of the linear relationship between the two variables, is influenced by the sample size. The aim of this study is to determine the relationship between sample size and significance level of the correlation coefficient. For this purpose, the significance levels of the correlation coefficients at different sample sizes were examined by keeping the correlation values constant.

In the study, four random variables with normal distributed are considered. The descriptive statistics of the variables were determined as 15±3, 25±5, 40±10, 60±15, respectively. The correlation coefficients were assigned between variables x_1 and x_2, x_3, x_4 are 0.2, 0.3, 0.5; the correlation coefficients were assigned between x_2 and x_3, x_4 are 0.7, 0.8 and 0.9, respectively, and the correlation was assigned between x_3 and x_4 is 0.9. According to given parameters data were generated with Monte Carlo simulation for different sample sizes (20, 30, 40, 50, 60, 70, 80, 90, 100, 200, 300, 500). For each case 100 samples generated. Correlation coefficients and significance levels of each sample were calculated. The number of P values less than 0.05 were determined.

In cases where the correlation coefficient is less than 0.5, the effect of sample size on the significance levels of correlation coefficient is greater. Thus, as the sample sizes of the variables having the same correlation structure increases, the significance levels of correlations also increases. In highly correlated cases, the significance levels of the correlations coefficients in the both small and large sample sizes were found statistically significant ($p<0.05$).

Keywords: linear relationship; low correlation; high correlation; small sample.

Risk Classification in Agricultural Insurance under Dependency Assumption

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Abstract

Risk ordering is a significant part of risk management. In order to rank actuarial risks, we firstly focus on their classification in a multivariate framework under dependency assumption. Classification of environmental risks is a specific area which evaluate risks geographically with fair and accurate standards. The tools proposed in the frame of the partial order theory may not always be helpful for the risk classification. It may be difficult to compare some types of risks analytically, although there is not a restriction that each pair of elements need be comparable in the partial ordering. In some cases, especially when we are interested in environmental risk classification, we may consider the geographic information of our data. Therefore, we can use geographic information system as a tool for comparing risks. In this study, we aim to investigate the aggregate claims of different risk classes in agricultural insurance in terms of their comparability under the dependency assumption. For this aim, we classify actuarial risks of an agricultural insurance portfolio according to spatial and temporal characteristics of hazard regions. We take into account the dependency of the individual claims exposed to similar environmental risks.

Keywords: aggregate claims, crop-hail insurance, geographic information, partial order theory, spatial statistics.

Growth Series for Some Algebraic Structures

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Abstract

There is a long history of studying combinatorial structures in the context of infinite groups. One example is growth series, where for a given set of generators, one counts the number of elements of length n, and converts this sequence into a formal power series. By calculating such series, it becomes possible to classify related groups. In this work, we will consider presentations of crossed and iterated crossed product of cyclic groups. By using this presentations, we obtain complete rewriting systems and then give normal forms of elements of this products. After that, by using these obtained normal forms we compute growth series of these products.

Keywords: growth series, rewriting system, normal form.

Adjustment of the Jackknifed Ridge Method to the Linear Mixed Models

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Abstract

Linear mixed models are statistical models that provide a useful approach for analyzing a wide variety of data structures which statisticians often encounter. The types of data that can be analyzed using the linear mixed models include longitudinal data, repeated measures data (including cross-over studies), growth and dose-response curve data, clustered (or nested) data, multivariate data and correlated data. The unknown parameters of fixed effects and random effects in linear mixed models are generally estimated by the best linear unbiased estimator (BLUE) and the best linear unbiased predictor (BLUP), respectively. However, in the presence of multicollinearity, alternative estimation methods were proposed.

Ridge method in linear mixed models is one of the methods proposed by Liu and Hu (2013) and Özkale and Can (2016). Although ridge method is the most known method in the case of multicollinearity, it carries a substantial amount of bias. Therefore, in this study, we deal with the jackknifed procedure to reduce the bias of ridge estimator. We investigate the mean square error of jackknifed ridge estimator as well as the ridge predictor to examine under which conditions the jackknifed ridge estimator and predictor has smaller mean square error than that of the ridge estimator and predictor and the BLUE and BLUP. Monte Carlo simulation study is used to judge the performance of the estimators and predictors.

Keywords: multicollinearity; ridge predictors; jackknifed ridge predictors.

Exam Scheduling Problem: A Case Study

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Abstract

Exam scheduling is one of the popular research subjects in operations research literature. Basically, this problem deals with assigning a set of exams to a set of time slots and classrooms. However, there are additional constraints that make this problem more difficult than a simple assignment problem. In this study, we present a mathematical programming model developed for the exam scheduling problem at Collage of Engineering and Architecture of Necmettin Erbakan University. We also discuss alternative solution methods.

Keywords: Scheduling, optimization, integer programming, heuristics

SELÇUK ÜNİVERSİTESİ

A Genetic Algorithm for multi-objective vehicle routing problem with simultaneous pick-up and delivery

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Abstract

"Vehicle Routing Problem" (VRP) is one of the most studied problems encountered in transportation and distribution systems at operational level. The VRP involves determining set of routes with minimum total distance covered by identical and capacitated vehicles in order to meet the delivery demands of customers from a depot. The VRP has evolved into several variants based on the features of its components. Due to changing legal and environmental conditions or increased recycling requirements, the need to include picking operations into transportation logistics along with traditional deliveries has increased. Delivery to and pick up from customers by using the same vehicle provides financial benefits. In this study a variant of VRP called "Vehicle Routing Problem with Simultaneous Pick-up and Delivery" (VRPSPD) is considered. In VRPSPD, customers are both linehaul and backhaul, and the vehicle has to deliver and collect goods simultaneously when it visits a customer. In the literature various number of approaches have been proposed to solve VRPSPD, most of which only minimizes total distance of routes. However, for most real life applications of logistics, there are other objectives that must be considered in addition to total distance. Hence, the VRPSPD needs to be tackled as a multi-objective problem. This study addresses "Multi-Objective VRPSPD" (MO-VRPSPD) by minimizing total distance and reducing the imbalance between the distance travelled by each vehicle and bridges a gap in the literature. Balancing the distance of routes is the most common objective in the literature after the total distance, as it ensures fairness in routing operations. Since MO-VRPSPD is an NP-hard problem, we propose an approach based on Genetic Algorithm (GA) to find the Pareto-optimal solutions. Moreover, to increase the performance of the algorithm we incorporate GA with a Local Search (LS) Algorithm that utilises domination concept during its search. The effectiveness of the proposed algorithm (GA-LS) is investigated by an experiment conducted on benchmark problem instances available in the literature. The computational results are compared to one of the most well-known algorithm in the literature, namely "Non-dominated Sorting GA" (NSGA2). GA-LS shows competitive performance and it outperforms NSGA2 for all of the problem instances.

Keywords: vehicle routing problem; multi-objective optimization; pick-up and delivery; genetic algorithm.

Location Selection for Solar Energy Fields Using Multi Criteria Decision Making Methods: Case of Turkey

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Abstract

With increasing world population and rapid industrialization, non-renewable energy resources are running out every day. It is a popular issue to produce energy from renewable sources in Turkey as worldwide. In fact, Turkey, which cannot produce enough energy to supply itself, and supplies energy from different countries to meet its needs, has an advantageous position in terms of renewable energy sources. Therefore, it is trying to reduce dependence to foreign countries on energy by carrying out new studies on this subject nowadays and investors are encouraged to generate energy from renewable energy sources. In this study, it was aimed to guide the investors to suitable cities from which can be obtained the most of solar energy through install the panel. The ranking of the 42 selected alternatives was investigated using multi-criteria decision making techniques. Firstly criteria weights were determined with AHP (Analytic Hierarchy Process). Afterwards, TOPSIS (Technique for Order Preference by Similarity to Ideal Solution), PROMETHEE (Preference Ranking Organization Method for Enrichment Evaluation) and MOORA (Multi-Objective Optimization by Ratio Analysis) were used to order the alternatives. Eventually, final ranking was reached with the Borda Count Method. As a result, the three most suitable cities in Turkey to establish solar energy facility were identified as Antalya, Burdur and Karaman, in Turkey.

Keywords: Renewable Energy, TOPSIS, PROMETHEE, MOORA.

SELÇUK ÜNİVERSİTESİ

Conformable Differential Transform Method for Fractional Differential Equations

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Abstract

In this study, two dimensional conformable differential transform method (CDTM) established on recently new defined comformable derivative for fractional calculus is presented firstly and then applied to fractional partial differential equations with single variable fractional. To show the reliability and accuracy of the this new method, two different problems which have known exact solutions are selected. The obtained results indicate that the used new technique is effective, useful and appropriate to solve the fractional differential equations.

Keywords: Conformable Derivative; Differential Transform Method; Fractional Partial Differential Equations.

Conformable Variational Iteration Method for Fractional Ordinary Differential Equations

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Abstract

In this presentation, the conformable variational iteration method (C-VIM) based on the new defined fractional derivative for fractional calculus named conformable derivative is introduced. C-VIM has been used to get solution of fractional order ordinary differential equations (FODEs). Numerical examples are tested to show the convenient features of the this method. Obtained solutions by C-VIM are compared with variational iteration (VIM) method and other numerical method based on the Caputo fractional derivative sense. The obtained results show that C-VIM is useful and practical to calculate the solution of non-linear fractional equations because of the definition of conformable derivative. As a result, this study is indicated that this new process has good outcome to compared other methods.

Keywords: Conformable derivative; Factional derivative; Fractional differential Equations; Variational iteration method .

Comparison of Classification Performances of Artificial Neural Networks, Adaptive Neuro-Fuzzy Inference System and Logistic Regression

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Abstract

It is aimed to compare classification performances of artificial neural networks (ANNs), adaptive neuro-fuzzy inference system (ANFIS) and logistic regression (LR). In this study, classification performances of these methods were compared by analyzing different medical datasets. When constructing ANN models, different number of hidden neurons and different transfer functions (tangent sigmoid and logarithmic sigmoid) were tried to achieve the best classifier model. Likewise to ANNs; when building ANFIS models, different membership functions (Gauss, triangular, trapezoidal and generalized bell functions) were used to make the best classifier fuzzy model. The Receiver Operating Characteristic (ROC) analysis was applied to prediction models and area under the curves (AUC), sensitivity, specificity, and Youden's index of each model were calculated. AUC was determined as comparison criterion of models. It's concluded that the level of correlation and difference between groups have a great importance on closeness of performances of the models – especially on ANFIS models. The fact that there is a significant difference between groups made classification performances get higher in all methods. Besides, significant correlation between independent variables provided increase in ANFIS results. Consequently; LR and ANN models are more flexible than ANFIS, given the data structure and ease of implementation. Therefore, a single classification method should not be considered in classification problems without examining data structure.

Keywords: Artificial Neural Network; Logistic Regression; Adaptive Neuro-Fuzzy Inference System; Classification.

The Comparison of Wavelet-based Features and Classification Methods in EEG Signals

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Abstract

In this study, classification performances of Support Vector Machine (SVM), K Nearest Neighbor (kNN), Decision Trees (DTs) and Logistic Regression (LR) were compared by using wavelet-based features of extracted electroencephalogram (EEG) signals which were derived in either normal or inter-ictal periods. In addition, wavelet-based features were compared to determine the most effective features in classification performance. EEG signals were first decomposed into frequency sub-bands by using Discrete Wavelet Transform (DWT) and then some statistical features were calculated from those to classify it's as normal or abnormal. The Receiver Operating Characteristic (ROC) analysis was applied to prediction models and area under the curves (AUC), sensitivity, specificity and accuracy of each model were calculated. AUC was determined as comparison criterion of models and features. As a result, respectively 89.9%, 85.3%, 81.5% and 77% accuracy rates for SVM, kNN, LR and DTs were obtained. In addition, the most effective feature was standard deviation in classification performance.

Keywords: EEG; Discrete Wavelet Transform; Support Vector Machine; Receiver Operating Characteristic.

SELÇUK ÜNİVERSİTESİ

Multi-Objective Vehicle Routing Problem with Simultaneous Pick-Up and Delivery: Preemptive Goal Programming and a Heuristic Algorithm

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Abstract

"Vehicle Routing Problem" (VRP) is an operational problem encountered in logistics. One of its variants introduced to define real life applications more efficiently is "Vehicle Routing Problem with Simultaneous Pick-up and Delivery" (VRPSPD) which has gained popularity with the increasing need of reverse flow of products. Since its existence, it has found applications in variety of transportation systems, including blood banks, grocery stores and beverage industries. In VRPSPD, a vehicle has to make delivery and pick-up simultaneously instead of making either delivery or pick-up alone while visiting a customer. VRPSPD is mostly tackled as a single-objective problem with the aim of minimizing total distance of routes in the literature. However, most of the logistics problems are multi-objective in nature and other factors should be taken into consideration in addition to the total distance. To bridge this gap, we address "Multi-Objective VRPSPD" (MO-VRPSPD) in this study. Our objectives include minimization of total distance of routes and reduction of imbalance between the distances travelled by each vehicle. Balancing the distance of routes is an important objective for companies as it ensures fairness in routing problems. We utilise Goal Programming (GP) approach, a commonly used technique in multi-objective optimization, for modelling and solving the MO-VRPSPD. Since MO-VRPSPD is an NP-hard problem, only small-size problems can be handled by Preemptive GP. Hence, we propose a hybrid algorithm based on Genetic Algorithm (GA) and Local Search (LS) to solve the Preemptive GP model of MO-VRPSPD. A series of experiments are performed to evaluate the performance of the proposed heuristic algorithm. First, we evaluate its performance by comparing the results with those of Preemptive GP model for small-size problems. Then, we investigate the effect of LS on the performance of the hybrid algorithm on larger problems by comparing its results with GA. Computational results show that the proposed hybrid algorithm outperforms the GA in terms of solution quality.

Keywords: vehicle routing problem; goal programming; multi-objective optimization; genetic algorithm.

A Numerical Investigation for a Model with Functional Response

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Abstract

In this talk, a discretization which shows a dynamic consistency for a model of predator-prey of continuous time with a functional response of Beddington-DeAngelis is analyzed. Standard finite difference methods usually show dynamic inconsistency with the continuous system. Because, these standard numerical methods do not guarantee positivity. One way to eliminate this problems is to use Nonstandard Finite Difference Schemes(NSFD).

Keywords: prey-predator models; Beddington-DeAngelis model; nonstandard finite difference scheme ; numerical methods.

Determining Efficiencies of Different Product Concepts Using Conjoint Analysis(CA) and Data Envelopment Analysis(DEA)

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Abstract

Preferences of costumers require a great deal of consideration to address consumer needs. On the other hand, product development is also a crucial process for producers in terms of both production and selling expenses for producers. Conjoint Analysis(CA) is an applicable multivariate method revealing utility of a multi-attributed products which can be decomposed into specific contributions of each attribute and possibly their interactions. Conjoint analysis methods are mainly seperated as traditional, adaptive and choice based conjoint analysis. Traditional conjoint analysis consists of factorial design (full profile), fractional factorial design (partial profile), paired comparison and self-explicated methods. The additive conjoint model is: $y_j = U_1(x_{j1}) + U_2(x_{j2}) + \ldots + U_r(x_{jr}) + Error$,where $U_t(\bullet)$ is the component utility function specific to the *t* th attribute and x_{jt} is the level for the *j* th profile on the *t* th attribute. No constant term is specified, but it could be included in any one of the component utility functions or assumed to be zero (without any loss of generality). The form of these functions varies with respect to the scale used for the attributes. Data Envelopment Analysis is used to measure efficiencies of the Decision Making Units (DMUs) containing multiple inputs and outputs. DEA models consist of Charnes-Cooper-Rhodes (CCR), Banker-Charnes-Cooper(BCC), multiplicative and additive models. Additive models are also known as non-orianted and Slack-Based models based on variable return to scale. Non-oriented measures quantify the improvements when both inputs and outputs can be modified simultaneously. The Slack-Based model is based upon input and output slacks as shown in the following formula:

$$\max \sum_{i=1}^{m} s_i^- + \sum_{i=1}^{m} s_r^+ \quad \text{subject to} \quad \sum_{j=1}^{n} \lambda_j x_{ij} + s_i^- = x_{i0} \qquad i = 1, 2, \ldots, m$$

$$\sum_{j=1}^{n} \lambda_j y_{rj} - s_r^+ = y_{r0} \qquad r = 1, 2, \ldots, s$$

$$\lambda_j, s_i^-, s_r^+ \geq 0$$

$$\sum_{j=1}^{n} \lambda_j = 1$$

The DMUs under evaluation are termed as efficient if and only if the optimal value is equal to zero. Otherwise, the non-zero optimal s_i^{-*} identifies an excess utilization of the i th input and the non-zero optimal s_r^{+*} identifies a deficit in the r th input. In this study, we studied on nine car attributes: brand, price, equipment, engine type, engine size, fuel consumption, gear type, type and color. We obtained 16 different car concepts to be ranked by 400 customers. Then, we obtained utilities of 16 car concepts using fractional factorial design. Results indicate that price, fuel consumption and brand are found as the most important attributes, respectively. The Slack Based Method (SBM) was used to evaluate car concepts where production and selling expenses are determined as inputs and utility of car concepts is output.

Keywords: product development, conjoint analysis, data envelopment analysis

SELÇUK ÜNİVERSİTESİ

Testing Procedures for Population Mean Based On Bootstrap under Ranked Set Sampling

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Abstract

Ranked Set Sampling (RSS) is a sampling technique when it is difficult to measure sampling units but when it is easy to rank them by means of techniques that do not require high cost and/or time. RSS was first proposed by McIntyre(1952) to estimate pasture yields.

The Bootstrap method was first introduced by Bradley Efron in 1979 and it is an alternative way to obtain empirical sampling distribution of statistics. It is a widely used method of estimating confidence intervals, the standard error of the estimator, and testing the hypothesis. Since the basic bootstrap method does not require any distributional assumption, it is very useful for statistical inferences. In this method, a large number of resamples of size n from original samples are randomly drawn with replacement.

The distributional information of the statistics is required for statistical inferences about the parameter under RSS. However, the exact distribution of this statistic cannot be determined in many cases. Asymptotic methods are alternatives for these situations. However, when the sample size is small, these methods do not work well especially in small cases. In small sample cases, resampling techniques such as Bootstrap can be preferred to asymptotic techniques. The Bootstrap method is also one of the most popular methods of resampling methods. Modarres et al. (2006) studied Bootstrap technique under RSS and they suggested three different sampling techniques with Bootstrap for the confidence interval of the population mean.

In this study, three different sampling techniques which were proposed by Modarres et al. (2006) based on Bootstrap under RSS were adapted to the testing procedure for population mean. In the simulation study, type 1 error rates for the population mean were compared with the nominal significance level for different set and cycle sizes under symmetric and non-symmetric distributions.

Keywords: Bootstrap method, ranked set sampling, type 1 error rate.

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SELÇUK ÜNİVERSİTESİ

Trend Analysis of Temperature in Konya Closed Basin

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Abstract

In this study, some trend analyses were performed to determine the variability of annual average temperature data belonging to Konya Closed Basin which is one of the major basin in Turkey. Trends of annual average temperature from 1980 to 2007 of fifteen stations in Konya Closed Basin were analyzed using non-parametric Spearman's Rho and Mann-Kendall methods. Homogeneity of trends was also tested by using Run (Swed-Eisenhart), Buishand and Kruskall Wallis methods. The linear slopes (change per unit time) of trends were calculated by using a Sen's Trend Slope method. Consequently, statistically meaningful increasing trends at the 0.05 significance level were found at ten stations of the investigated basin. And the rest 5 stations have no trend.

Keywords: Mann-Kendall; Sen's Trend Slope; Spearman's Rho; Konya Closed Basin.

*Presenter

Non-parametric inference for α-series process

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Abstract

In the statistical analysis of a data set with occurrence times of successive events, a general approach is to use counting process model. If the data set has independent and identically distributed (iid) property homogenous Poisson process (HPP) or more generally the renewal process (RP) model can be used. However, in some situations identically distributed feature does not hold and the data set may follow a trend. In this case a non-homogenous Poisson process (NHPP) can be used. If the successive inter-arrival times follow a monotone trend, Cox-Lewis and Weibull process models may be preferred. Some alternative monotone counting process models have been proposed for the monotone trend case. Lam Y. (1988) has introduced the geometric process (GP) and applied this process to deteriorating and ageing systems. Later, Braun W.J., Li W. and Zhao Y.Q. (2005) have defined the α-series process (ASP) where the GP could be inappropriate. Up to now, statistical inference problem for an ASP has been studied extensively. Some of them are Aydoğdu H., Şenoğlu B. and Kara M. (2010), Kara M., Aydoğdu H. and Türkşen Ö. (2015) and Kara M., Aydoğdu H. and Şenoğlu B. (2016). Also, non-parametric inference problem has been investigated in detail by Aydoğdu H. and Kara M. (2012). Although, the modified moment (MM) estimator has been proposed in the study of Aydoğdu H. and Kara M. (2012), its consistency property has not been proved yet. In this study, we prove consistency of the MM estimator for the expectation and variance of first occurrence time of an ASP. Additionally, we give a novel method to distinguish the ASP from a RP.

Keywords: α-series process; non-parametric inference; modified moment; consistency.

Time Series and Artificial Neural Network Forecasting of the Electricity Demand for a Private Electricity Distribution Company

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Abstract

Electricity is an energy source that can be transported from the region where it is produced by transmission and distribution networks, whereas it cannot be stored. For this reason, estimation of electricity energy demand is very important in terms of operational and financial planning. The aim of this study is to forecast the 10 year (2017-2026) electricity demand of the distribution region that consists of Konya, Karaman, Aksaray, Nevşehir, Niğde and Kırşehir provinces to support the feasibility analysis and the investment plans of a private electricity distribution company. Time series and artificial neural network forecasting models are generated for the variables of "Number of customers, Energy input to the distribution system, and Demand", which have to be estimated for 10 years according to regulations.

Keywords: electricity demand; time series analysis; artificial neural networks.

Statistical Modeling with Credit Scorecard

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Abstract

Scorecard system uses credit score generated by scorecard when the lender (usually the financial institution) decides. Scorecard is formed based on statistical calculations and business logic and helps evaluate the risk of credit usage. It is the statistical application of the financial field. The formation of Scorecard is based on applied statistic rather than the use of theoretical statistic. Credit scoring is a set of decision models and their underlying techniques that aid lenders in the granting of consumer credit. These techniques describe who should get credit, how much credit they should receive, and which operational strategies will enhance the profitability of the borrowers to the lenders.

Credit scoring predict whether or not a credit extended to an applicant will likely result in profit or loss for the lending institution. But in all cases, a lender provides fund to an individual or an institution, and expects to be paid back on time with interest commensurate with the risk of default.

Numerous statistical analysis and modeling techniques are applied for estimating profit or loss. The most common and most preferred techniques for the analysis is the Logistic Regression Models. In addition, discriminant, linear, probit, decision tree, artificial intelligence-genetic models are also used. After the establishment of the statistical model, following statistical measures are displayed on the Score Distribution Analysis: Value of Information, Gini Coefficient, Diversity Index, Kolmogorov-Smirnov statistic (KS), Chi-Square statistic, P-Value, Degrees of Freedom (DF).

A scorecard is created at the expense of the model and the validation of this scorecard is made using the statistical calculations. The statistical calculations used in the validation phase are; Binomial test, Chi-Square (Hosmer-Lemeshow) tests.

Numerous data mining and classification approaches have been developed for credit scoring purposes. The presentation content is going to address the use of analysis and methods discussed above.

Keywords: Credit Scorecard, Credit Scoring, Logistic Regression; Loan Default

Determining Main Factors Affecting Violence amongst Working Women: The Case of Erzurum City

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Abstract

Violence amongst woman has an important place globally as a societal issue and it is considered as a violation of human rights. The authorized institutions has been struggling to overcome this issue since 1960s. Violence amongst woman is commonly regarded as a serious risk factor as both personal and social in terms of psychological and physical health. When violence amongst woman is discussed the first that comes into mind is physical violence, which involves all types of assault towards woman body. The main objective of this study is to determine exposure to violence, types of violence and factors affecting violence amongst women working in Erzurum city using ordered logistic regression model. The sample of this study includes 565 adult working women in Erzurum during 2017. The data of this study are cross-sectional data obtained from a well-written questionnaire conducted to working women in Erzurum. STATA and SPSS 20 package programs were performed to analyze and evaluate the corresponding data. 18.1% of the respondents claimed that they were seldomly exposed to physical violence while the percent of frequently physical violence corresponds to 2.1%. According to ordered logistic regression analysis; factors such as age, occupation, current residence, educational level, monthly income, viewpoint towards the current policies of the Ministry of Family and Social Policies for violence amongst woman, other examples of violence amongst woman and the presence of an authorized father were found to have a statistically significant impact on physical violence amongst woman. Results reveal that younger women were more likely to expose to physical violence than their elder counterparts. Other examples of violence amongst woman and the presence of an authorized father had an increasing impact on physical violence amongst woman. Physicians, workers and teachers were more likely to expose to physical violence than officers. Women living in districts than living in city centers, primary and secondary educated women than high school educated women and women who had low-income than high-income counterparts were more likely to expose to physical violence. Women who have claimed that the current policies of the Ministry of Family and Social Policies for violence amongst woman are sufficient were less likely to expose to physical violence.

Keywords: Violence amongst woman, domestic violence, ordered logistic regression

CFD Analysis of Air-Water Flow Structure in a Circular Dropshaft

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Abstract

Circular dropshafts, commonly used in urban storm water systems for energy dissipation and flow control, are characterized by significant flow aeration. Historically, physical models have been constructed in hydraulic laboratories to study these behaviors. Today, with the use of high performance computers and more efficient computational fluid dynamics (CFD) codes, the behavior of hydraulic structures can be investigated numerically in reasonable time and expense. In this study, three dimensional CFD modeling of drop-shaft behavior is described. In the numerical model, a series of tests were performed in a circular dropshaft having two identical horizontal inflow and outflow circular channels and a circular drop chamber having diameter of for various diameters for observing flow patterns and measuring air bubble entrainment flow parameters. The observations showed distinct flow regimes associated with nappe impact in the shaft pool, in the outflow channel, or in the opposite shaft wall. Measurements were conducted for different flow conditions of the circular inflow channel. In the shaft pool, the results obtained from measurements demonstrated the complexity of different air entrainment mechanisms.

Key words: drop-shaft, numerical analysis, hydraulic structure, CFD models

Conditional Time of Ruin and Reinsurance

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Abstract

In this paper, we derive a hazard rate function based on the exact finite time ruin probability formula to obtain the probabilities for conditional time of ruin. We calculate the expected time of ruin and conditional expected time of ruin with the exponential claim amounts under the excess of loss reinsurance arrangement. We obtain the probabilities for the conditional time of ruin by deriving the hazard rate function which we call force of ruin. We analyse the behavior of the force of ruin function based on numerical results. We investigate the effect of an excess of loss reinsurance arrangement on the force of ruin and measure the changes of the force of ruin according to different retention levels. This finding confirms that the force of ruin might be considered as a criterion to decide the optimal retention levels for the excess of loss reinsurance arrangements.

Keywords: conditional time of ruin, exact finite time ruin probability, excess of loss reinsurance, force of ruin.

SELÇUK ÜNİVERSİTESİ

On Distribution of Bivariate Record Statistics

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Abstract

Record values and record times have wide applications in many areas including biology, engineering, economics and environmental events. In this study, we consider the componentwise records in bivariate sequences. Let $\{(X_k, Y_k)\}_{k\geq 1}$ be a sequence of independent and identical (iid) bivariate random vectors with an absolutely continuous distribution function (cdf) $F_{XY}(x,y) = C(F_X(x), F_Y(y))$, where $C(u,v)$, $[u,v] \in [0,1]\times[0,1]$ is the connecting copula and $F_X(x), F_Y(y)$ are corresponding marginal cdf's. A bivariate observation (X_i, Y_j) is called an upper record value if $(X_i, Y_j) > (X_{i^*}, Y_{j^*})$ for all $(i^*, j^*) < (i, j)$ if and only if $i^* < i$ and $j^* < j$. The upper record times (i, j) are the indices at which upper record values occur can be considered in such cases $i < j$, $i > j$ and $i = j$. First, the distribution of second upper record times has been derived and the results are shown to depend on copula functions of bivariate random vectors. Furthermore, we obtain the joint probability distribution and density function of second upper record values. By using the derived distribution functions, the prediction of future record times and record values given past records has been investigated. Some numerical and graphical results for underlying bivariate distribution with exponential marginals including the independence case are provided.

Keywords: record times; record values; joint distribution function.

Bayes Estimators of Reliability Function of Inverse Gaussian Distribution under Different Loss Functions

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Abstract

In this paper, we derive the Bayes estimators of reliability function of a two parameter Inverse Gaussian distribution for complete data by using Lindley's approximation. Bayes estimators are obtained for an informative prior under the linear exponential (LINEX) loss, general entropy loss, and squared error loss functions. Based on the Monte Carlo simulations, these estimators are compared with corresponding maximum likelihood estimators (MLE) in terms of the mean square error (MSE) and bias. The simulation results show that in the most of the considered cases, Bayesian estimator using LINEX loss function outperforms the other estimators with regards to MSE, while MLE has lower bias than the other estimators.

Keywords: Inverse Gaussian distribution; Reliability function; Lindley's approximation; Asymmetric loss function

Spectral Analysis of the Impulsive Schrödinger Operators

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Abstract

In this talk, we consider the second order differential equation

(1) $$-y''(x) = \lambda^2 y(x),\ x \in \mathbb{R}\backslash\{0\}$$

with impulsive condition

(2) $$\begin{bmatrix} y_+(0) \\ y'_+(0) \end{bmatrix} = \begin{bmatrix} a & b \\ c & d \end{bmatrix} \begin{bmatrix} y_-(0) \\ y'_-(0) \end{bmatrix}$$

where a,b,c,d are complex numbers and λ is a spectral parameter. Let L denote the operator generated by (1) and (2) in $L^2(0,\infty)$. In this study, we investigate the problem of locating spectral singularities and eigenvalues of L depending on the choice of coupling constants a,b,c,d. We also examine the special cases where the point interaction is P-, T- and PT- symmetric.

Keywords: spectral singularity; impulsive condition; eigenvalue; PT- symmetry.

Using auxiliary information: Ratio Estimation or Poststratification

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Abstract

The auxiliary information can be used for statistical analysis, stratification or estimating parameters. Many highly efficient estimation techniques in survey sampling require strong information about auxiliary variables to reduce the sampling error, potential nonresponse and coverage bias. Only strong correlations between auxiliary variables and target variables or between auxiliary variables and response behavior help to reduce the bias. Hence estimates of population parameters will be more accurate. The most common estimation methods using auxiliary information at estimation stage are ratio and regression estimator. A method similar to the regression estimation but more general is calibration estimator. Poststratification is a well-known and frequently used calibration estimator which is used to improve the precision of survey estimators when categorical auxiliary information is available from sources outside the survey. The purpose of this study is to compare ratio estimation and post stratification in terms of their mean squared error via a design-based perspective. The situations also discussed in which whether ratio estimator or post stratification should be used in practice.

Keywords: Auxiliary information; Ratio Estimation; Poststratification; Calibration.

SELÇUK ÜNİVERSİTESİ

The Sandwich Variance Estimators for the Parameter Estimates of Generalized Measurement Error Models

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Abstract

The sandwich variance estimator has accomplished increasing use with the growing popularity of generalized estimating equations. Therefore; sandwich variance estimators are a common tool used for variance estimation of parameter estimates. This approach yields consistent estimates of the covariance matrix without making distributional assumptions; and even if the assumed model underlying the parameter estimates is incorrect. Because of this desirable model property, the sandwich estimator is often called the robust covariance matrix estimator, or the empirical covariance matrix estimator.

In classical linear models, the explanatory variables are assumed to be known or observable, but in real world the explanatory variables cannot be correctly observed, either because it is unavailable, or mismeasured. This situation causes some problems in statistical inference. This problem called measurement error creates biased estimators for parameters and their variances. The conditional and corrected score functions are derived the generalized estimating equations to obtain consistent and unbiased estimators.

In this study, the sandwich variance estimator is used to estimate the variances of the parameters in generalized linear measurement error models. These estimators have the properties of unbiasedness, efficiency and asymptotic normality.

Keywords: Generalized estimating equations; generalized measurement error models, conditional and corrected score functions, sandwich variance estimator.

Numerical Computation of the Variance Function in Geometric Processes

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Abstract

Geometric process (GP) is widely used as a stochastic monotone model in many practical applications such as system reliability, software engineering, maintenance, queueing systems, risk and warranty analysis. Most of these applications need knowledge of the geometric function $M(t)$, the second moment function $M_2(t)$ and the variance function $V(t)$. The geometric function $M(t)$ which cannot be obtained in an analytical form is studied by many researchers. Braun et al. give upper and lower bounds in the case of the exponential distribution for the geometric function $M(t)$. Tang and Lam propose a numerical solution to the integral equation given for the geometric function $M(t)$ for four common lifetime distributions, namely, exponential, gamma, Weibull and lognormal. Aydoğdu et al., Aydoğdu and Karabulut obtain power series expansion for $M(t)$ in the case of exponential and Weibull distributions by using the integral equation given for the geometric function $M(t)$. Even though there are many studies for the geometric function $M(t)$ in the literature, there are limited number of studies for the variance function $V(t)$. The first one is based on a numerical approximation and the second study has been done based on a Monte Carlo estimation (Aydoğdu and Altındağ). However, both of these studies depend on the convolutions of the distribution functions which require complicated calculation to obtain the variance function $V(t)$. Therefore, a relatively simple and useful method for computing the variance function $V(t)$ is needed. In this study, for this purpose, an integral equation for the second moment function $M_2(t)$ of the GP is obtained. A numerical method which is proposed for the geometric function $M(t)$ by Tang and Lam is adapted to compute the integral equation. To show the effectiveness of the method, the first interarrival time is assumed to be one of four common lifetime distributions as exponential, gamma, Weibull and lognormal. Some computational procedures are also given to compute the variance function $V(t)$ after the calculation of $M_2(t)$.

Keywords: geometric process; integral equation; trapezoidal rule; variance function

Power Series Expansions for the One-Dimensional Probability Distribution and Mean Value Function in Gamma Geometric Processes

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Abstract

Geometric process (GP) is widely used as a stochastic monotone model in many practical applications such as system reliability, software engineering, maintenance, queueing systems, risk and warranty analysis. Most of these applications require knowledge of the probability distribution of $N(t)$ and its mean $M(t)$. However, the distribution of $N(t)$ and its mean $M(t)$ can not be obtained in closed forms. In this study, the GP is considered when the distribution of the first interarrival time is assumed to be gamma. An analytical expression for the one-dimensional probability distribution of this process is derived as a power series expansion of the convolution of the gamma distribution. Furthermore, using the integral equation given for the mean value function $M(t)$, it is shown that $M(t)$ can be represented by a power series of t^k when the first interarrival time has a gamma distribution.

Keywords: geometric process; geometric function; power series; gamma distribution.

Modeling the Vehicle Headway Based On Kernel Function Using Different Sampling Scheme

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Abstract

The elapsed time between two vehicles is called time headway in a transit system. The distribution and the analysis of the vehicle time headway are important to manage the traffic capacity and the vehicle delays. In this study, we suggest the kernel method based on ranked set sampling for the density estimation of headway. The data which is analyzed in this study is collected by the Laboratory of the Civil Engineering at Dokuz Eylül University and obtained from the observations made on three-lane Yeşildere route in İzmir. We design a Monte Carlo simulation study to compare the performances of the kernel functions according to their mean integrated squared errors.

Keywords: kernel function, density estimation, mean integrated squared error

The statistical analysis of bus transportation for four largest cities in Turkey

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Abstract

Transportation has an important place in the continuity of urban social life. Public transportation (such as buses, rail systems, ferries), which is widely used today for individual transportation, has a very complicated and complex structure with its stops and lines. The structural and relational outcomes achieved by statistical analysis of these complex networks can help in the realization of arrangements and improvements. Bus transportation networks (BTNs), which have an important place in the public transportation network, is handled statistically and sample evaluations are made on bus transportation network for 4 largest cities of Turkey. Connections on different parts of a network produce differences in topological representation of the network. BTNs consist of bus stations and routes as vertices and connections (edges) in two-dimensional space and networks are named under C-, L- and P-space topologies according to connection types among stations and routes. In this study, BTNs of four largest cities (İstanbul, İzmir, Ankara, Bursa) in Turkey are analysed under C-, L- and P-space topologies. These topologies are evaluated by statistical network analytic methods such as node degree distribution, centrality, clustering, assortativity and shortest path length. Node degree analysis shows that BTNs of İstanbul, İzmir, and Ankara are scale-free in L- and P-Space. While the BTN of Bursa shows random growth, the nodes in the other three major cities are preferentially included in the network. Assortativity analysis shows that the BTNs of four cities are assortative in C- and L-Space while disassortative in P-Space. Results show that the shortest path values of networks, that is the highest number of transfers required for the shortest transport between two points in the network, are small (such as 3, 4) values that reflect the small-world behavior. Small shortest path values are more apparent in P-Space are observed in all topologies. Thus, BTNs of cities reflect the small-world and scale-free properties that are shown by calculating degree, closeness, and betweenness centralities of nodes and also the correlation between mean centrality and degree for networks are described by power-law. As a result, BTNs of four cities have a real-world network property that reflects the high clustering, betweenness centrality-degree correlations, low average path length and power-law distribution. Network characteristics of cities' bus networks are revealed with statistical analysis of networks. These values can help in defining the most suitable locations in the process of expanding the network, ie. adding new routes and stations.

Keywords: network statistics; statistical analysis; bus transportation network.

Fuzzy based calculation for solar radiation augmentation

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Abstract

Increasing population and industrialization have led to an increase in energy demand. Fossil fuels, which are the primary source of increasing energy demand, have environmental, social and economic disadvantages. Renewable energy is seen as the most important source of alternative energy sources against these disadvantages. The sun is the most important renewable energy source with direct and indirect use. High-tech and high-efficiency solar energy systems (Photovoltaic, PV and Concentrating Solar Power, CSP) are widely used in direct energy acquisition. Uncertainties due to extra-terrestrial, atmospheric, and terrestrial factors cause major problems in the calculation of solar radiation reaching solar energy systems. This study deals with the calculation of the energy potential to be obtained from horizontal reflector solar energy systems on the basis of fuzzy logic considering these uncertainties. Hourly and daily average radiation values are estimated in the developed model based on isotropic sky model. The model based on isotropic sky estimates the hourly and daily average radiation values by using beam, diffuse and reflected radiation values. The view factor is calculated using the Hotel's cross-string method, depending on the reflector and collector surface areas. Since view and reflection factors are expressed with angular values, they are not expressed in fuzzy terms. Unlike the total radiation calculation models (Isotropic, HDKR and Perez models) on curved surfaces, the reflection value for reflective surfaces is defined by high and specific reflection values. The developed fuzzy-based calculation method estimates daily and monthly solar radiation values of ground-level reflecting systems for different climatic regions of Turkey. Thus, solar energy varieties based on physical and atmospheric uncertainties are revealed and regional potential of solar energy systems with reflective properties can be determined. The results obtained from the fuzzy logic based model examples show significant differences from the results obtained from the general isotropic calculation methods. This results indicate that the predicted extra-terrestrial, atmospheric, and terrestrial uncertainties have significant effects on the radiation values and the calculation of energy potentials.

Keywords: fuzzy logic; solar radiation; solar energy.

An Application of Multi-Objective Optimization Approach to Saponification Process

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Abstract

In industrial processes, determination of optimal operating conditions is the most important part for economical respects. Generally, the industrial processes have more than one outputs with many inputs. From this point of view, most of the industrial problems can be considered as multi-objective optimization problems. In this study, a continuous saponification process is considered as an application field. The process has four inputs (sodium hydroxide, ethyl acetate concentrations, and their volumetric flow rates) and two outputs (conversion of sodium hydroxide and space time). It is aimed to obtain compromise values by maximization of the conversion of sodium hydroxide and minimization of the space time, simultaneously. In this case, the saponification process as regarded as a multi-objective optimization problem. The pareto solution set is obtained by using a evolutionary multi-objective algorithm. And also, the compromise operating conditions of process are chosen by using a multi-criteria decision making approach.

Keywords: Saponification process; multi-objective optimization; multi-criteria decision making

Trend Analyses of Konya-Karapınar Region in Turkey using Non-Parametric Methods

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Abstract

Climate change is having serious impacts on the world's water systems through more flooding and droughts. For this reason, the future impact of climate change is being analyzed by many researchers in various fields with different variables. Trend analysis is widely used to detect climatic changes. Many researchers are working on determining trends in long-term meteorological parameters such as precipitation, temperature, wind speed and relative humidity. This study aims to determine trends of annual and monthly precipitation, temperature (min, max, average), relative humidity and wind speed parameters between 1964 and 2005 for Karapınar meteorology station in Konya. Homogeneity of the data, Run (Swed-Eisenhart) and Standard Normal Homogeneity Test. Non parametric Seasonal Mann-Kendall and Sen's T trend methods are applied to meteorological variables. As a result, it was determined that all meteorological parameters except the wind speed were homogenous. Statistically significant trends were determined for maximum temperature and wind speed data of annual average data in Karapınar Station.

Keywords: Seasonal Mann-Kendall; Sen's T; Run (Swed-Eisenhart); Climate Change.

Evaluation of the Performance of the Classification Models in Data Mining

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Abstract

The process of a model evaluation in data mining estimates how well a model generalizes the data. The evaluation requires some criteria to compare the model performance. Measures in data mining generally use accuracy and reliability for validation. This paper compares the different methods such as support vector machines, random forests, principal component analysis and multivariate adaptive regression splines to obtain the classification accuracy of the models for a binary response variable. Assessed validity of evaluation and comparison using a real data set is provided for each method. The metrics computed from a confusion matrix using training and testing procedures on same data are determined and which classifier performs well is discussed.

Keywords: machine learning; validation; accuracy

Computer Aided Architectural Project Evaluation

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Abstract

Architecture is in a multi-faceted relationship with other sciences during the stages of analysis, programming, modelling, material selection, construction system and marketing. Working in partnership with different disciplines at each stage ensures that the relevant stage is terminated economically and practically. Especially with the end of the 20th century, the rapid development of computer technology has triggered the relationship between technology and architecture. As a result, modern architectural approaches have emerged today. In this study, it has been tested how intelligent systems can be successful in evaluating the final product in architectural design. From the motivation of this point of view, the educational building projects whose models and drawings were designed by students were evaluated in the direction of basic design principles determined within the scope of architectural design studio course which is the most important part of architectural education in terms of time and effect. The 16 different educational building projects designed by the students were evaluated by 51 architects (architecture fourth graders). Five different criteria have been taken into consideration. The numerical evaluations obtained according to the relevant parameters are turned into a matrix format and some intelligent systems used in the literature were desired to estimate the scores. The evaluations of the projects based on basic concepts such as form, function, aesthetics, flexibility and authenticity were carried out by using different intelligent system methods such as Artificial Neural Network (ANN), Artificial Bee Colony (ABC) and Regression Analysis (RA). The results of these methods have been tested for prediction success. According to the results of the analysis, while ANN and ABC algorithms failed to show sufficient success, RA largely predicted the results of students and jury members with high accuracy ratios.

Keywords: architecture designing; project evaluation; intelligent systems; regression analysis

SELÇUK ÜNİVERSİTESİ

Numerical Calculation of Flow Discharge under Sluice Gates

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Abstract

Sluice Gates are widely used in hydraulic structures such as dams and open channels to control discharge and flow depth. Besides the practical use of sluice gates, calculating the flow characteristics under sluice gates is one of the problems of hydraulic engineering, because the theoretical calculations are not perfectly compatible with the experimental results due to the scale effect. Also building a physical model is time consuming and expensive. In recent years, numerical modeling by using Computational Fluid Dynamics (CFD) for the solution of physical models has become the alternative computing method. In this study, to determine the discharge and depth of a free flow passing under a sluice gate, a physical model is constructed in the laboratory. Additionally a numerical model which has the same size and features of the physical model is created in CFD. For both physical and numerical models, the discharges and flow depths are calculated for 15 different water levels and 3 gate opening rates. In conclusion, CFD model results and experimental results presented 90% consistency with each other. This study also shows that CFD models using Reynolds Averaged Navier-Stokes (RANS) equations will be useful for the design of hydraulic structures.

Keywords: hydraulics; sluice gate; discharge; CFD.

Model based inference using ranked set samples

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Abstract

This paper develops statistical inference based on super population model in a finite population setting using ranked set samples (RSS). The samples are constructed without replacement. It is shown that the sample mean of RSS is model unbiased and has smaller mean square prediction error (MSPE) than the MSPE of a simple random sample mean. Using an unbiased estimator of MSPE, the paper also constructs a prediction confidence interval for the population mean. A small scale simulation study shows that estimator is as good as or better than simple random sample (SRS) estimator when the quality of ranking information in RSS is low or high, respectively, and the cost ratio of obtaining a single unit in RSS and SRS is not very high. Simulation study also indicates that coverage probabilities of prediction intervals are very close to the nominal coverage probabilities. Proposed inferential procedure is applied to a real data set.

Keywords: ranked set samples; cost model; coverage probabilities; relative efficiency.

Comparison of Skewness Procedure for Symmetric Distributions

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Abstract

Most of statistical analyses are based on normal distribution assumptions such as hypothesis testing, regression analysis, experimental design and time series. However, there are lots of inferences in literature that non-normal distributions are much more common than the normal distribution. In addition, observations in a sample which are too small or too large as compared to the bulk of observations are called outliers. Their presence seriously affects the performance of the normal theory procedures. For this reason, lots of authors have proposed different skewness procedures which include the normal distribution as well as the plausible alternatives of it with different levels of skewness and kurtosis. This provides us flexibility for modeling the data with "normal-like" shape but with skewness and heavy tails. In this study, we have reviewed the skewness procedures which have been used in statistical applications and have compared these procedures with respect to some statistical features.

Keywords: symmetric distributions; skewness procedure; normal distribution; t distribution.

Comparison of Vuong and Clarke Tests for Bivariate Copula Selection

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Abstract

The dependence structure in multivariate data can be modelled by copula functions. When choosing an appropriate copula function that gives best possible fit is a problem, goodness-of-fit tests may be considered. The bivariate Voung and Clarke tests are proposed for bivariate copula selection. In this study, we are interested in the accuracy of Vuong and Clarke tests based on the proposed score methods.

Keywords: dependence; copula; goodness-of-fit-test; Vuong Test, Clarke Test

Assessment of Heavy Metals Analyses Using Multivariate Statistical Techniques In Relation To Drinking Water Standards: A Case Study from Turkey

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Abstract

Water quality analyses are very important in terms of determining facies of the existing water resources and their qualities for drinking water standards. Multivariate statistical methods provide important tool for achieving this purpose. In this study, some selected heavy metals/trace elements were evaluated in terms of drinking water quality according to the Turkish Drinking Water Standards, European Union Water Directive and World Health Organizations Standards. The water samples used in this study were collected from deep groundwater wells which were drilled in the Kayseri volcanic rock aquifer system in Turkey. Water sampling was carried out three times in one water-year with 13 samples for each period. 16 selected heavy metals/trace elements were analysed for a total of 39 groundwater samples. The seasonal values of selected heavy metals/trace elements were used for calculations and evaluation of drinking-water quality analysis by using multivariate statistical analyses as Principal Component Analysis (PCA), Cluster Analysis (CA) and Factor Analysis (FA) methods. As a result of the CA, water samples that collected each periods were classified into three different groups. The results, it was revealed that the groundwater had different heavy metals/trace element contents and contaminant types. The other multivariate statistical analyses as PCA and FA were used for analysing each sampling period. For analysing FA, "PCA" was used as an extraction method and "Varimax with Kaiser Normalization" was used as rotation method, also rotation converged in 5 iterations. The results of the FA, the first (wet season) sampling period was determined by 3 factors which was explained %79.8 of the total variance, as the first factor %27.4, the second factor %27.0 and the third one is %25.4. The second (dry season) sampling period was determined by 4 factors which was explained %86.1 of the total variance, as the first factor %27.0, the second factor %25.3, the third factor %19.3 and the fourth one is %14.4. The third (wet season) sampling period was determined by 4 factors which was explained %79.7 of the total variance, as the first factor %31.0, the second factor %21.4, the third factor %15.9 and the fourth one is %11.4. These percentages were evaluated in terms of anthropogenic (domestic and agricultural) and geological origin influences on the trace elements according to heavy metals/trace elements limits in the drinking water quality standards.

Keywords: trace elements, groundwater quality, principal component analysis, cluster analysis

Classification of EEG Signals for Detection of Epileptic Seizures using Artificial Neural Networks based on Wavelet Transforms and PCA

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Abstract

This study presents an efficient approach that ensures an accurate classification of Electroencephalogram (EEG) signals for detection of epileptic seizures. Essentially, this approach is based on discrete wavelet transforms (DWT's), Principal Component Analysis (PCA) and artificial neural networks (ANNs). While DWT's and PCA deal with feature extraction and reduction processes, respectively; ANNs are used to classify EEG signals with respect to cases of subjects. In order to improve the accuracy ratios at the classification process, the proposed algorithm utilizes the specific levels of DWT's for different bandwidths in EEG signals. To control complexity, the features obtained from DWT's are reduced by PCA. Lastly, ANNs with gradient based algorithms classify EEG signals using these reduced features as principal components. In analysis, the proposed procedure is applied to a benchmark data set related to epileptic seizures. As a result, the proposed algorithm brings out better performances than the other approaches in the literature in context of detection of epileptic seizures. In addition, this approach not only allows making deeply analysis of EEG signals, but also provides more robust model configurations in terms of reliability and complexity.

Keywords: Epileptic Seizures, Discrete Wavelet Transform, Principal Component Analysis, Gradient Based Learning.

*Presenter

Parameter estimation for the accelerated failure time (AFT) model under type II censoring: Skew t distribution

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Abstract

In this study, estimators of the parameters in accelerated failure time (AFT) model under type-II censoring are obtained, see Gedik (2014). We assume that the distribution of the error terms is Skew t (ST). The reason of assuming ST as an error distribution is that it is flexible for modeling the data sets having skewness and long-tails. It should also be noted that ST reduces to the skew normal (SN) and to the well known Student's t distribution.

In the estimation procedure of the unknown parameters, we use the maximum likelihood (ML) methodology. Likelihood equations do not have closed form solutions, we therefore solve the likelihood equations with respect to the parameters of interest numerically by using the well known iteratively reweighting algorithm (IRA). We also obtain modified maximum likelihood (MML) estimators of the unknown parameters, see Tiku (1967). It is known that MML estimators are the functions of the sample observations and are asymptotically equivalent to the ML estimators besides being robust.

An extensive Monte Carlo simulation study shows that ML estimators are more efficient than the MML estimators as expected. However, if our focus is to obtain the efficient estimators and to avoid computational difficulties simultaneously, MML estimator can also be preferred. At the end of the study, an example is given to show the implementation of the proposed methodologies.

Keywords: AFT model, Skew-t, type-II censoring, modified likelihood

Maximum Likelihood Estimation for the Parameters of Skew-t Distribution Using Genetic Algorithm

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Abstract

Skew-t (St) distribution is widely used for modelling the data sets having skewness and heavy tails in literature. It is an Azzalini type skew extension of the well-known Student's t distribution. In particular case, St distribution reduces to the Skew Normal distribution. It is obvious that St distribution is much more flexible than the Skew Normal and Student's t distributions for modelling purposes. We use the Maximum Likelihood (ML) methodology to estimate the unknown parameters of the St distribution. However, solutions of the likelihood equations cannot be obtained as explicit functions of the sample observations. To overcome this problem, many different numerical search techniques can be used. In this study, we use Genetic Algorithm (GA) which is a popular search technique inspired by the process of the biological evolution based on natural selection. GA has generally better performance than the traditional numerical search techniques. In this paper, we propose a new method based on the robust confidence intervals (CIs) for identifying the search space in the context of St distribution. We use modified maximum likelihood (MML) estimators of the parameters in constructing the CIs, see Yalçınkaya (2016, Ph.D. Thesis, Ankara University, Turkey, Continue). An extensive Monte Carlo simulation study is done to compare the efficiencies of the ML estimators of the parameters using GA with the corresponding ML estimators using traditional Newton-Raphson (NR) and Nelder-Mead (NM) techniques. At the end of the study, we apply the proposed methodology to a real life data for illustration.

Keywords: Skew-t; genetic algorithm; maximum likelihood; modified maximum likelihood; Monte Carlo simulation.

Linear contrasts in one-way ANOVA with non-identical and non-normal error distributions

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Abstract

Şenoğlu and Tiku (2002) (*Linear contrasts in experimental design with non-identical error distributions*, Biometrical Journal 44 (3), pp. 359-374) estimated the linear contrasts in experimental design and tested their assumed values when the distribution of the error terms is non-identical Generalized Logistic (GL). They showed that their solutions have higher efficiencies than the corresponding normal theory solution.

In this study, Şenoğlu and Tiku (2002) is extended to a more general case. Different than their study, the distribution of the error terms is assumed to be Jones and Faddy's Skew *t* (JFST) that can be symmetric or skew depending on the values of the shape parameters *a* and *b*; see Jones and Faddy (2003). It is known that JFST reduces to the well-known Student's *t* distribution with *2a* degrees of freedom when $a=b$, and it converges to Normal distribution when $a=b\rightarrow\infty$. It is positively skewed for $a>b$ and negatively skewed for $a<b$.

We compare the efficiencies of the proposed estimators and the tests based on them with the corresponding least squares (LS) estimators and the tests based on them via Monte Carlo simulation study.

Keywords: Linear contrasts; Jones and Faddy's Skew *t*; Modified likelihood; Non-identical.

Estimation of the parameters in one-way ANOVA under type II censored samples

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Abstract

In this study, the maximum likelihood (ML) and the modified maximum likelihood (MML) estimators of the model parameters in one-way analysis of variance (ANOVA) under type II censored samples are obtained; see Arslan (2015). We assumed that the distribution of the error terms is Jones and Faddy's Skew *t* (JFST); see Jones and Faddy (2003). We compare the efficiencies of the ML estimators with the corresponding MML estimators by using the Monte Carlo simulation study. In the comparisons, bias and mean square error (MSE) criteria are used. Simulation results showed that the MML estimators have more or less the same efficiencies with the corresponding ML estimators as expected. It is also concluded that if our focus is to obtain the efficient estimators of the parameters, we prefer to use the ML estimators. If our concern is to avoid the computational difficulties and to obtain the efficient estimators, simultaneously, we prefer to use the MML estimators. A real data is analyzed at the end of the study to illustrate the implementation of the proposed methodologies.

Keywords: One-way ANOVA, Jones and Faddy's Skew *t*; Modified likelihood; Type II censoring.

SELÇUK ÜNİVERSİTESİ

Morphological and morphometric analysis of sella turcica by multislice computed tomography

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Abstract

The important structures around the sellar region make its morphology and morphometry important. The sella region may cause some pathologies because the size or shape change can press or affect the function of the neighboring structures, and it can be difficult to identify various problems or regional structures in surgical interventions. We aimed to determine the size and volume of normal sella turcica in our study, to identify the shapes and anatomical variations of sella turcica and to compare the obtained measurements with respect to age, gender and presence of the pituitary adenoma. A total of 200 individuals (101 females, 99 males) with 24 pituitary adenomas were evaluated in our study. Sella turcica anteroposterior diameter, transverse length, depth, volume were measured by multislice computerized tomography. Variations of sella turcica were identified and classified. The obtained data were statistically evaluated. In healthy individuals, sella turcica anteroposterior diameter, transverse length and depth were determined to be 0,97 ± 0,176 cm, 1,117 ± 0,162 cm and 0,906 ± 0,151 cm in females and 1,017 ± 0,196 cm, 1,156 ± 0,164 cm and 0,896 ± 0,178 cm in males respectively. The difference between gender of sella turcica anteroposterior diameter, transverse length and depth was not statistically significant ($F_{(3,172)} = 2,029$ $p = 0,112 > \alpha = 0,05$). The difference between group mean of sella turcica transverse length pituitary adenomatous individuals and healthy individuals was not statistically significant ($t_{198} = -0,050$, $p = 0,960 > \alpha = 0,05$). Sella turcica anteroposterior diameter and depth were found statistically larger in pituitary adenomatous individuals than in healthy individuals ($t_{26,334} = -4,742$, $p = 0,000 < \alpha = 0,05$, $t_{198} = -6,117$, $p = 0,000 < \alpha = 0,05$). The shape of sella turcica was examined in six groups including normal sella turcica, oblique anterior wall, double contour sella, sella turcica bridge, irregular dorsum sella, pyramid shaped dorsum sella. The most common type among healthy individuals was normal sella turcica (%53,4) followed by irregular dorsum sella type (%17) and the least common type was oblique anterior wall type with %13,6. The most common type of pituitary adenomatous individuals was normal sella turcica (%83,3) followed by oblique anterior wall and irregular dorsum sella (%8,3), pyramid shaped dorsum sella were not seen. While the data obtained by the measurements in our study support the normal sella turcica numerically, the identification of the possible variations and different shapes to be obtained will reduce the possible complications in surgical procedures.

Keywords: Sella turcica, morphometry, morphology, variation, multislice computed tomography.

Application of Multi-Criteria Decision-Making Methods in the Selection of Cargo Firms

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Abstract

In recent years, developed technology has provided to facilitate forms of transportation, reduce the costs, introduce new markets and enhance various selection criteria offered by logistics companies. Competitive levels among logistics companies due to intensive customer demands are tend to increase and it has become a necessity to determine the most appropriate cargo firm in order to meet these demands. Moreover, decision- making about cargo firm is a curious issue for companies, since this process includes a hard work- flow. The objective of this study is to solve the problem about selecting the appropriate cargo firms by using scientific methods and provide convenience for the companies. Multi-criteria decision making methods (MCDM) was used to determine the most appropriate cargo firms for the selected companies within this study.

Keywords: Decision- Making, Multi-Criteria Decision-Making Methods, Cargo Firms

Modeling of Monthly Evaporation Prediction using Artificial Intelligence Methods

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Abstract

Accurate estimation of evaporation as complex process is quite difficult and very important for water resources management and planning. This study investigated the usability of Support Vector Machine (SVM) and Generalized Regression Neural Network (GRNN) methods in estimation of monthly total evaporation. In this study, the monthly air temperature (min, max, mean), wind speed, relative humidity, precipitation and pan evaporation data obtained from Salihli station operated by the Turkish Meteorological Organization in Turkey were used. Root mean square error (RMSE), mean absolute error (MAE), determination coefficient (R^2) and Nash-Sutcliffe Efficiency Coefficient (E_{Nash}) were used to assess the prediction pover of the results obtained from models.

Keywords: Support Vector Machine; Generalized Regression Neural Network; Meteorological Data.

ENSO Effect on Eastern Anatolia Streamflow

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Abstract

The scientists dealing with hydrology have proved that many oceanic-atmospheric events affect the climate distributions on the world, i.e. hydro-climatological parameters change due to these events. One of the most important oceanic-atmospheric events is named as El Nino Southern Oscillation (ENSO) and occurs between the western coasts of South America and Indian Ocean. This study will determine the effects of ENSO on the streamflow characteristics of Turkey by means of Eastern Anatolia. For this purpose, 15 streamflow gauging stations existing at the Eastern Anatolia are considered in this study. Synthetic monthly streamflow data corresponding to the El Nino years of the time series were generated using Feed Forward Back Propagation Artificial Neural Network (FFBPANN) model and replaced with the original data of the considered time series. Then, both synthetic and original streamflow data sets were compared with each other in terms of their statistical characteristics (variance, mean, population, autocorrelation) to determine whether the synthetic and original data present different behaviors or not. As a conclusion, significant ENSO effects were obtained for the streamflow data of Eastern Anatolia especially in terms of variance, autocorrelation and population parameters that should be taken into consideration for long term drinking water, irrigation, energy and environmental planning purposes. The results can be extended for all the contiguous countries of Eastern Anatolia to obtain more accurate "ENSO Affected Regions" to be considered in the subsequent studies.

Keywords: ENSO; FFBPANN; streamflow; Anatolia.

Weighted Model Selection for Time Series

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Abstract

Time series model selection has gained a significant popularity and a variety of methods has been introduced in the recent years. It is crucial for a method to propose a candidate model as the final model that explains the procedure underlying a series best and provides accurate forecasts among many candidates.

In this study, it is aimed to compare the performance of widely preferred model selection methods with their weighted combination in terms of determination of order and forecasting for Box-Jenkins models.

Simulation studies under various scenarios and applications on a diverse set of data have been used for the evaluations. Hence, weighted model selection criterion performs better than the individual methods.

Keywords: weighted model selection; performance comparison; Box-Jenkins models.

The Szeged Estrada index of a graph

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Abstract

A topological index is a number related to graph which is invariant under graph isomorphism. In theoretical chemistry, molecular structure descriptors (also called topological indices) are used for modeling physicochemical, pharmacologic, toxicologic, biological and other properties of chemical compounds. The Estrada index *EE* has an important role in Chemistry, since it is a proposed molecular structure-descriptor, used in the modeling of certain features of the 3D structure of organic molecules, in particular of the degree of folding of proteins and other long-chain biopolymers. In this study, we define the Szeged Estrada index of a graph as $(G) = \sum_{i=1}^{n} e^{\sigma_i}$, where $\sigma_1, \dots, \sigma_n$ are the Szeged eigenvalues. Some bounds for the Szeged Estrada index of a graph are obtained, some inequalities between the Szeged Estrada index and the Szeged energy are also obtained.

Keywords: Bounds; Eigenvalues; Estrada index; Graph; Szeged Energy.

*Presenter

The Influence of Longevity Risk on Pension Funds: Turkish Case

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Abstract

Over the last decades, human life expectancy has increased leading financial insecurity in social security and private pension systems. Even though having a young population compared to many developed countries, Turkish pension system is prone to mid and long term financial deficit risks due to its structure and unpredictability on its parameters. Hence, longevity risk has to be taken into account based on recent reforms. This study aims to evaluate longevity risk for Turkish pension system by first, comparing the commonly used mortality tables in insurance sector then by using the population census data between 1931 and 2015 to forecast the mortality rates with conjunction to linear trend models. Then the longevity risk under different retirement ages are examined over a hypothetical portfolio. Results show that longevity risk cannot be neglected for Turkey, and the highest risk group consists of 65-year-old males, implying that there is still room for male mortality development more than female population. Although, the longevity risk cannot be hedged the remaining risk can be deduced with the help of pooling.

Keywords: longevity risk; Turkish pension system; lee-carter model; mortality rate.

Bivariate Risk Aversion for Utility Copula Functions

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Abstract

In this study, the risk aversion and copulas are discussed in fields such as insurance, actuarial and risk. Copula functions are a useful tool to model the dependency of random variables. On the other hand, it can be decided with the coefficient of risk aversion that it is appropriate to choose which of the investment instruments. The risk aversion coefficient is also related to utility functions. The aim of this study is to find the bivariate risk aversion coefficient based on the utility copula generated by the bivariate utility function to select one of the dependent portfolios. For this purpose, utility copulas are obtained for different bivariate utility functions. In addition, copulas based risk aversion coefficients are derived and the results are presented with some tables and graphs for various parameter values.

Keywords: Bivariate risk aversion, utility copula, dependence, bivariate utility function

Estimation of Trend Function in Trend Renewal Process with Weibull Distribution

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Abstract

A stochastic process $\{N(t), t \geq 0\}$ is called counting process if it counts the number of the events that occurs as a function of time. The sequence of interarrival times in accordance with this process uniquely determine the counting process. For example, if the interarrival times are independent and identically distributed random variables with a distribution function F, then the renewal process (RP) can be used in modelling of this counting process. However, in many maintenance, replacement applications and some analysis in reliability theory, the data set comes from a counting process includes random variables that alter in some systematic way. Systematic changes mean that there is a trend in the pattern of the data set and the interarrival times are not identically distributed. In such cases, the trend-renewal process (TRP) can be directly used as a model. The TRP is defined as follows.

Let $\lambda(t)$ be a non-negative function on $t \geq 0$, and let $M(t) = \int_0^t \lambda(u)du$.The process $\{N(t), t \geq 0\}$ is a $TRP(F, \lambda(.))$ if the time-transformed random variables $M(S_1), M(S_2), \ldots$ is an RP(F), that is, if $M(S_1), M(S_2) - M(S_1), M(S_3) - M(S_2), \ldots$ are independent and identically distributed with cumulative distribution function *F* where S_i is i^{th} arrival time of the process $\{N(t), t \geq 0\}$for $i = 1,2, \ldots$. The distribution *F* is called the renewal distribution, and $\lambda(.)$ is called the trend function of the TRP.

Estimation of the trend function in trend-renewal process is an important problem. In this study, we consider this problem in case of Weibull distribution.

Keywords: Trend-renewal process; Weibull distribution; power law intensity; trend function estimation

*Presenter

Investigating of Ability Parameter Estimation Using Bootstrap Method for 2-parameter Logistic Model

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Abstract

Item Response Theory (IRT) is a mathematical model which models the relation among examinee and item parameters. This theory is based on the probability of giving correct answer to a given specific question. This probability is the correctly answer of *i* th examinee on *j* th item and shown as $P(Y_{ij} = 1/\theta_i)$.

The most widely used models used in IRT are one-parameter logistic model (1-PL), two-parameter logistic model (2-PL) and three-parameter logistic model (3-PL). 1-PL logistic model is also known in literature as Rasch model containing item discrimination parameter (a_j). 2-PL logistic model consist of both item discrimination and difficulty parameters (b_j) . In addition to the item discrimination and difficulty parameters, 3-PL logistic model has a chance parameter (c_j).

In this study, 2-PL logistic model, which is widely used, is approached. Item discrimination and difficulty parameter ranging from $-\infty$ to $+\infty$, but in practice, b values ranges from -3 to +3, when the examinee parameter (θ) has standard normal distribution. If an item has a positive high b value, it means that the item is hard. In addition, if an item has a positive high value, it means that the item discriminate examinees well.

The 2-PL logistic model equation is given below.

$$P(Y_{ij} = 1/\theta_i) = \frac{\exp[a_j(\theta_i - b_j)]}{1 + \exp[a_j(\theta_i - b_j)]}, \quad i = 1,2,\dots,n; \quad j = 1,2,\dots,k$$

In this study, Joint Maximum Likelihood (JML) is applied to estimate item and ability parameters. According to JML, when the item parameters are estimated, ability parameter is able to estimate, simultaneously. Also, the aim is to compare obtained parameter estimation results between original sample and Bootstrap sampling according to the confidence interval and standard error with a detailed simulation study. In consideration of obtained results, it can be inferred that the standard errors of the parameter estimations obtaining by bootstrap method is more sensitive.

Keywords: 2-PL logistic model, parameter estimation, bootstrap sampling

Comparison of Psychometric Properties of a Measurement Tool In Terms Of Classical Test Theory and Modern Test Theory

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Abstract

The measurement tools are used to determine the level of the characteristic under investigation and express it in numbers. So, if the observations are made more sensitive, objective and standard measurements could be obtained. The scale can be defined as a measurement tool used in the assessing the latent characteristics. Psychometric properties of a scale (validity, reliability, usefulness and responsiveness) are the determinants of its suitability as a clinically useful measure. Validity expresses the ability of a scale to measure what it intends to measure, whereas reliability describes its ability to be consistent, to have small errors of measurement. A valid and reliable scale is clinically relevant if it is able to assess the change over time. Also, this measurement tool should be easy and have low cost to develop, apply and evaluate.

When studying in health field, there are two common approaches for examining the psychometric properties of a scale: classical test theory (CTT) and modern test theory (MTT). While the CTT had a long historical background and commonly used in education, MTT has lots of advantages over CTT. In CTT, the item characteristics depend on the sample used and the level of people's characteristic depend on the item set used. However, MTT, especially Rasch model assumes that both item and person characteristics are independent of the sample and item set, respectively. This feature is known as "measurement invariance" or "specific objectivity" in Rasch model.

In this study, methods used for the examination of the psychometric properties will be described via both approaches. This paper will provide for researchers how each property is assessed using these approaches.

Keywords: psychometric properties, reliability, validity, scale, measurement tool, classical test theory, modern test theory.

Measurement Equivalence via Factor Analysis and Rasch Analysis

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Abstract

Measurement equivalence (invariance) is a statistical property of measurement which indicates that the same construct is being measured across some pre-specified groups. For example, a scale is said to be "invariant" if a measure is interpreted in a conceptually similar manner by respondents representing different genders, age groups or cultures.

This property could be assessed at the item or test level. At the test level, factor analysis is an appropriate statistical analysis in that the factor score can be thought as an individual's true score and the observed random variables are represented by the items. Factorial invariance is established if the factor loadings and thresholds are equivalent across groups. At the item level, modern test theory (MTT) models provide an appropriate psychometric framework in that a person's expected score on any one item acts a proxy for the true score and the observed score on that same item represents the observed random variable. Item-level invariance is established if the item parameters are equivalent across multiple groups. In other words, for all values of the latent construct, the item true scores are identical across groups. Both factorial and item-level equivalence is necessary when one wants to confirm measurement equivalence.

Although measurement equivalence is assessed using different approaches, "Multiple Group Confirmatory Factor Analysis (MG-CFA)" under factor analysis and "Rasch Analysis" under MTT are commonly used methods. In this study, the measurement equivalence of the Modified Health Assessment Questionnaire (MHAQ), has been evaluated by "MG-CFA" and by "Rasch Analysis" in terms of gender and disease duration. According to the results, it has been confirmed with both methods that MHAQ has measurement equivalence for both person characteristics.

Aside from the different aspects of MG-CFA and Rasch analysis, using them together to test the measurement equivalence is considered important in terms enabling us to make a comparison between the results obtained.

Keywords: measurement equivalence, multiple group confirmatory factor analysis, Rasch analysis

Comparing of Principal Component Analysis and Grey Relational Analysis in Measuring the Performance of Turkish Non-Life Insurance Companies

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Abstract

The non-life insurance is defined as a service that protects the assets of individuals. The performance of insurance companies operating in Turkey is evaluated according to different financial ratios such as liquidity, equity, activity and profitability ratios. These ratios are obtained from the annual activities report of non-life companies which published Republic of Turkey Prime Ministry Undersecretariat of Treasury and Insurance Association of Turkey. Principal Component Analysis and Grey Relational Analysis are used in the performance of each insurance company. It is assumed that the Grey Rational Analysis ignores the dependence between variables, while the dependence between variables are included in The Principle Component Analysis. The results are compared and examined under these assumptions.

Keywords: Principal Component Analysis; Grey Relational Analysis; Measuring the Performance of Insurance Companies; Financial Ratios.

The Effect of Macro-Economic Factors on Housing Markets: US Case

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Abstract

The real estate market is one of the leading and locomotive markets in national economies due to its high dependence on domestic capital, its creation of high added value, the magnitude of its employment potential, and the strong relation to the other markets. And the housing market is one of the biggest submarket of real estate market and it is a massive factor in householder's consumption; therefore, it is one of the biggest components in the basket of goods used for calculating the consumer price index (CPI) in most of the industrialized countries. Therefore, this paper aims to determine the influence of the dynamic effects of specific macroeconomic variables (i.e. mortgage rates, inflation, and unemployment) on the house price indices, with particularly on the S&P/Case-Shiller National Home Price Index for the United States (U.S.) housing market. In the determination, we used the novel regression methods: the generalized linear regression (GLM) and Multivariate Adaptive Regression Splines (MARS). Our models allow for the interactions among the independent variables and they are consistent with U.S. data for the period 2000 to 2015.

Keywords: real estate; housing market; mortgage; economic indicators; GLM.

On Conformable Double Laplace Transform

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Abstract

In this study we introduce the conformable double Laplace transform of partial fractional derivatives and integrals where the derivatives and integrals are in the sense of newly defined conformable type. Then some properties of conformable double Laplace transform are expressed. Finally fractional heat equation which is used in various applications in science and engineering is investigated as an application of this new transform.

Keywords: Double Laplace Transform; Conformable Fractional Derivative; Conformable Fractional Integral; Fractional Heat Equation.

M Estimators and a New Function in Non-Linear Regression with R

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Abstract

Today, the most frequently encountered problem in the statistical analysis of researchers is the provision of licensed programs. Therefore, the R program, which is a free statistical software, constitutes the common use environment of many disciplines. In the R program, a new analysis is added day by day, or updated so as to make the user more convenient. In this study, a non-linear regression analysis, which is a common method used by most researchers in modeling, from a robust estimator to R for the M estimator, a new function is provided to make the user perform an easier and more comprehensive analysis with a weight function defined by the user.

Keywords: R programming, Nonlinear regression, M Estimators

Evaluation of Prediction Performance of Some Ridge Estimators in Linear Regression Analysis by K-Fold Cross Validation Method

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Abstract

Multicollinearity is one of the main problem which researcher encounter with in linear regression analysis. Ridge regression method is widely used to solve this problem. The main problem of ridge regression method is selection of ridge parameter. Different ridge parameters are suggested by many researchers in literature (Hoerl and Kennard 1970, Hoerl et al. 1975, Lawless and Wang 1976, Hocking, Speed and Lynn 1976, Kibria 2003 to mention a few). In this study prediction performance of some of the ridge parameter estimators are compared by simulation study and a real data set application is also given. Comprehensive study based on the investigation the performance of the frequently used ridge parameter estimators and automatic choice approach of Cule and Iorio (2013) is done. K-fold cross validation method is used in evaluating the performance of selected estimators and results are also compared by using mean square error (MSE) and predicted residual error sum of squares (PRESS) statistics.

Keywords: Multicollinearity, Ridge Estimator, Cross Validation, Automatic Choice

Wrapping Flexible Skew Laplace Distribution on Unit Circle

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Abstract

Circular or angular observations could be encountered in different subjects in science such as meteorology, medicine, biology, geology, physics, and sociology. A popular approach to obtain circular models is wrapping method. In this study, the wrapped version of the flexible skew Laplace (FSL) distribution and its some properties will be presented. This wrapped distribution is the generalization of wrapped Laplace distribution and has more flexibility properties in terms of skewness, kurtosis, unimodality or bimodality. A real data example is analyzed in the last section.

Keywords: Circular Distribution; Flexible Skew Laplace Distribution; Wrapped Distribution; skew-symmetric distribution.

Cuscore Control Chart Parameter Optimization for Detecting Special Signals In IMA (1,1) Time Series

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Abstract

Control charts are visual tools used to identify specific causes that may occur during the process in statistical process control. Shewhart control charts are insufficient to determine small deviations even though they are quite successful in determining large deviations in the process. In the literature, EWMA (Exponential Weighted Moving Average) and CUSUM (Cumulative Sum) control charts have been developed as an alternative to Shewhart control charts for determining small deviations. However, in some special processes including time series data such as IMA (1,1) (Integrated Moving Average) some special signals can be occurred like spike, step, bump, rump etc. In such cases, CuScore (Cumulative Score) control chart is a powerful tool for determining such special signals. In this study, it is aimed to find the optimum parameter values of CuScore control chart which maximizes the probability of signal detection and minimizes the probability of false signal detection considering the cases where special signals such as spike and bump are occurs or not. In the literature, there is no approach that maximizes the probability of signal detection and minimizes the probability of false determination. In the previous studies, the decision maker intuitively determines the parameter values for detecting the signal added to the process. Therefore, an experimental plan was developed by considering corresponding parameter values by using DOE (Design of Experiment). Experiments were conducted depending on the plan and the results were analyzed statistically. At the end of the study, a systematic approach has been proposed to find compromised solutions that maximize the probability of signal detection and minimize the probability of false signal detection. The compromised solutions were found by the help of polynomial regression equations. This approach is thought to give a different point of view for detecting special signals in some special processes including times series data.

Keywords: CuScore control chart; time series analysis; parameter optimization; design of experiment

A New Approach Using Hidden Markov Model and Bayesian Method for Estimate of Word Types in Text Mining

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Abstract

In text mining, it is important to analyze words to obtain meaningful information and information extraction from texts. Determining of word types are first stage to generating information from text and estimate sequence word in sentence. Because the Turkish words are in the group of the agglutinative language, Turkish words have the roots and suffixes. Suffixes may be change structure and meaning of words. This change complicate to extract information from Turkish texts.

In the study, it was developed to develop an algorithm and model to predict the word types from texts in order to be able to extract information from Turkish texts. The model is based on the Hidden Markov Model and Bayesian Method, which are stochastic methods. In the model, Algorithm is developed which separates roots of Turkish words from their suffixes. Algorithm categorize words according to count of character in Suffixes.

In order to test Prediction performance of developed model, this model were applied Turkish text in Web Environment. As a results, Hidden Markov Model and Bayesian- based model were successfully applied to prediction of the word types. Hidden Markov Model and Bayesian-based Model were successfully predicted word types. It was observed that this model has a high accuracy rate in the estimates.

Keywords: Algorithm; Information Extraction; Stochastic Model.

SELÇUK ÜNİVERSİTESİ

Antenatal Acute Toxoplamosis Dıagnosis in First Trimester Pregnancy

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Objectıves
Toxoplasmosis is a widely-distributed zoonosis caused by Toxoplasma gondii protozoa. Although there is a high prevalence of unapparent infections, toxoplasmosis can develop into a severe systemic illness when in its congenital form, in which the mother, when infected for the first time during pregnancy, can present a temporary parasitemy with focal lesions generated within the placenta, thereby infecting the fetus. The incidence of maternal infection during pregnancy ranges from 1 to 8 per 1000 susceptible pregnancies, with the highest reported rates in France. However, the rate in France has significantly decreased in the past decade; the incidence of *Toxoplasma* infection diagnosed by seroconversion in French women was 2.1 per 1000 in 2010. Toxoplasma seropositivity rates in our country Region varies from region to region. This rate is higher in eastern cities. The highest rate in our country is the high eating habits of raw meat in Şanlıurfa. Our aim in this study is to evaluate the patients who have been diagnosed with new toxoplasm in our hospital for 6 months.
Methods
In our study, the toxoplasma results of the first trimester pregnant patients who applied to our polyclinic in the second half of 2016 were evaluated. 391 cases were included in the study. Patients whose laboratory results were not available or under-investigated were excluded from the study. In our policlinic, toxoplasmosis IgM is primarily required in first trimester pregnancies. If positive, IgG and avidity are desired. Further investigation is carried out according to the avidity result. SPSS 22 and Microsoft Excel 2007 program were used in the analysis of our work.
Results
A total of 8(2%) patients had positive toxoplasmosis IgM. 4 (1%) patients had high avidity, 1 (0.2%) patients had moderate avidity, and 3 (0.7%) patients had low avidity.
Conclusions
There is no consensus on the screening of all pregnancies. Screening of all pregnancies is recommended in places where the general view seroprevalence is high.
Keywords: acute toxoplamosis, pregnancy, infection

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Hysteroscopy Complications: Our three year experience

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Objectıves
A hysteroscope is a telescope that is inserted into the uterus to visualize the endometrial cavity, as well as the tubal ostia, endocervical canal, cervix, and vagina. Hysteroscopy can be performed for diagnostic and therapeutic indications. Hysteroscopy is performed for evaluation or treatment of the endometrial cavity, tubal ostia, or endocervical canal in women with abnormal premenopausal or postmenopausal uterine bleeding, endometrial polyps, submucosal, and some intramural, fibroids, and infetrtility. Hysteroscopy also involves a number of complications such as every surgical procedure. Complications from hysteroscopy are rare, but some are potentially life threatening (1). A multicenter study of 92 centers and over 21,000 operative hysteroscopic procedures reported a complication rate of 0.22 % (2). The most common complication was perforation of the uterus (0.12 %), followed by fluid overload (0.06 %), intraoperative hemorrhage (0.03 %), bladder or bowel injury (0.02 %), and endomyometritis (0.01 %)(2).
Methods
Between 2014 and 2016, records of patients who underwent hysteroscopy surgery at Selcuk University Medical Faculty Obstetrics and Gynecology Clinic were retrospectively collected. The indications for surgery and pathology results were also reviewed. SPSS 22 and Microsoft Excel program were used in the analysis of our work.
Results
The total number of cases is 244. Hysteroscopic operation have been made 63 (25,8%) in 2014, 56 (23,0%) in 2015 and 125 (51,2%) in 2016. The mean age was calculated as 44 (±10.7). When the indications were taken into account, there were 148 (60,7%) polyps, 70 (28,6%) others(diagnostic, infertility, congenital anomaly, isthmocele). A total of 3 (1,2%) complications were observed. 1 (0,4%) case had bladder perforation and 2 (0,8%)cases had uterine perforation. All of the complications were recognized during the operation and laparotomy was applied. There has not been any patient death.
Conclusions
Hysteroscopy is a method that facilitates gynecological operations by showing the uterus cavity directly. Learning and application is an easy method. But every physician who practices this method should be aware of the complications and be careful. The complication rate of our clinic was found similar to literature.
Keywords: hysteroscopy, complications, gynecological operation

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Hypothesis testing in one-way classification AR(1) model with Student's t innovations: An application to a real life data

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In this study, we estimate the model parameters in one-way classification AR (1) model when the distribution of the error terms is independently and identically distributed (iid) Student's t. Maximum likelihood (ML) methodology is used in the estimation procedure. We also introduce the F statistic based on the ML estimators of the parameters for testing the equality of the treatment means. See also Yıldırım (2017) (M.S. Thesis, METU, Ankara, Continue) and Şenoğlu and Bayrak (2016) (Linear Contrasts in one-way classification AR (1) model with gamma innovations, Hacettepe Journal of Mathematics and Statistics 45(6), pp. 1743-1754).

Then we compare the efficiencies of the ML estimators of the unknown parameters with the corresponding LS estimators via an extensive Monte Carlo simulation study. Simulation results showed that the ML estimators in all simulation scenarios are more efficient than the corresponding LS estimators as expected. Powers of the test statistic based on the ML estimators are also compared with the corresponding test statistic based on LS estimators. At the end of the study, we analyse a real life data set in order to present the implementation of the methodology. For this purpose, we compare our results with the corresponding normal theory results based on this data.

Keywords: one-way ANOVA; AR (1) model; Student's t; Monte Carlo simulation.

Investigation of Factors Causing Formation of Kidney Stones via Structural Equation Modeling

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Abstract

Structural equation model (SEM) can be defined as a multivariate statistical methodology for testing models including both causal relationships and correlations between observed variable and latent variables. SEM has wide usage by social, behavioral, and educational scientists as well as biologists, economists, and medical researchers, etc. In this paper, the authors tried to show the details of SEM approach for detecting the causality between physical characteristics (F1), blood pressure (F2), blood sugar (F3), cholesterol (F4) and formation of kidney stones (Y1). The main objective of this study is modeling the kidney stones formation. For this aim four factors (F1, F2, F3, and F4) are used as estimators of the formation of kidney stones (Y1). The developed model provided an acceptable fit to collected data (N=100). It can be seen that one unit increase in the “F1” leads 0.54 units increase in “F2”, 0.21 units increase in “F3”, and 0,46 units increase in “F4”. In addition, one unit increase in the “F3” leads 0.22 units increase in the “Y1”. However, relationships between "F2"→"Y1", and "F4"→"Y1" are not found statistically significant.

Keywords: Causality; Latent variable, Structural Equation Model, Kidney stones.

Forecasting the Amount of Sulfur Dioxide (SO_2) and Particulate Matter (PM_{10}) in the Air Using Grey Prediction and ARIMA Methods

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Abstract

Air quality is one of the most important factors affecting the quality of life of the living. Despite the fact that the air pollution problem is more common in cities with particularly developed industrial and overpopulated areas, polluted air is a common problem in all around the world. The gases released by vehicles and industrial plants and low-quality coal and similar fuels consumed to warm up in winter cause air pollution. Since the presence of pollutant gases in the air affects the life of the living negatively, a sustainable quality of life depends on not exceeding the threshold values of the pollutant gases. States take legal measures to prevent air pollution by taking this situation into consideration and take various measures. There are more than 200 air quality monitoring stations under the control of the Ministry of Environment and Urbanization in Turkey. The amount of pollutant gases in the air is known thanks to the measurements made at these stations. The predictions to be made using data obtained from these stations help to make comments on future air pollution and determine the precautions to be taken. In this study, using the measurements recorded to determine the amount of SO_2 and particulate matter PM_{10} in the air by the stations in Trabzon, the amounts of these substances in the air for the next periods are estimated by Grey Prediction and ARIMA (Autoregressive Integrated Moving Average) methods based on time series analysis. At the end of the work, there are measures that can be taken to prevent the SO_2 and PM_{10} substances, which adversely affect the quality of the air, from interfering with the air.

Keywords: Air Pollution, Trabzon, Grey Prediction, ARIMA

Types of Pareto Distribution and Some Properties

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Abstract

In this study, probability density functions of some types of Pareto distribution were examined the moments about origin, moments about mean, variance, mode, median, skewness and kurtosis values. It is expressed the relation among those distributions. Studies in the literature have examined these properties when usually some parameters of these distributions are zero. However, there isn't such kind of restrictions in our study. Therefore this study is an extension of previous studies.

Keyweords: Pareto; moments; skewness; kurtosis.

Test Statistic for the Significance of a Correlation Coefficient using Jackknife Estimator in Simple Linear Regression

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Abstract

In this study, the application of the jackknife method, which is one of the resampling methods, to simple linear regression is examined. In addition, the jackknife estimate of the correlation coefficient are examined and this estimate provides an effective alternative test statistic for testing the null hypothesis that there is no relationship between the independent variable and the dependent variable. In the application, model parameters, standard errors, coefficients of correlation, bias and %95 confidence intervals belonging to jackknife methods is estimated with the help of a real data and the obtained results are interpreted.

Keywords: Jackknife; coefficient of corelation; ols estimates; bias.

Comparison of Performances of Latent Dirichlet Allocation and Hidden Markov Model for Open-Ended Questions Analysis

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Abstract

Since responses given to open-ended questions in scales have qualitative content, it is not possible to perform statistical analysis like items with Likert type or multiple choice items. Open-ended questions are measurement tools that contain the most detailed responses about the topic and reveal the cause-and-effect relationship. Open-ended questions can not be analyzed with statistical methods, so they are not preferred on scales. New methods were developed in text mining since development of Machine Learning Methods. Machine Learning algorithm and statistical methods can extract information from text. Also this methods can perform text summarization and topic determining.

In this study, performances of some stochastic models used in text mining were compared to perform quantitative analysis of open-ended questions used on scales. In Study Latent Dirichlet Allocation methods were used. Latent Dirichlet Allocation (LDA) are performed to predict topic and content of text. LDA is a probabilistic model. Other method is Hidden Markov Model. Hidden Markov Model (HMM) predict probabilities of hidden status by using transition probabilities of observations. Both methods automatically analyze responses given to open ended questions and this methods adapted to be able to score responses. The analysis performances of both methods were compared and their contributions to the scoring were evaluated.

As a result it is observed that analysis of open-ended questions can be successfully used both methods. In terms of analysis and scoring performances, Hidden Markov Model was observed to be more successful than Latent Dirichlet Allocation.

Keywords: Scale, Quantitative Analysis, Stochastic Methods, Scoring.

One Dimensional Flood-Map Formation for Samsun Çarşamba River

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Abstract

Floods are one of the most important natural disasters unfavorably affecting many countries on the world, which can cause serious life and property losses. Therefore, the data prediction related to floods plays a great role for simulations and taking precautions against them. For this purpose, the modeling processes of the predicted data of floods can reduce the amount of losses. As Geographic Information System (GIS) is widely used for collecting data and solving problems of many branches of science, it was also used in this study to investigate the flood effects visually, to make flood analyses and to prepare the flood risk/risk maps by the integration of HEC-RAS software program that is able to make hydraulic calculations. In this study, the research area is selected as Çarşamba River flowing into Black Sea after passing through Samsun Çarşamba Plain, and one dimensional streamflow modeling was carried out for a hundred year return-period discharge (Q100) of this river. As a result of modeling, risk maps were prepared, and necessary precautions were suggested by determining the risky areas. By the help of this study, the importance of floods was emphasized, the flood risk maps were determined and the necessary precautions against floods were suggested in terms of risk levels. Moreover, the formation of "Flood Information Systems" will be contributed by the aid of similar studies.

Keywords: Flood; GIS; HEC-RAS; Samsun.

Southern Oscillation Effect on Eastern Anatolia Precipitation

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Abstract

Southern Oscillation (ENSO) is one of the most important oceanic-atmospheric events on the world which sometimes considerably affects the hydrologic parameters of the world which occurs between the western coasts of South America and Indian Ocean. The objective of this study is to determine whether ENSO affects the precipitation characteristics of Eastern Anatolia of Turkey or not. For this purpose, 28 precipitation stations existing at the Eastern Anatolia are considered in this study, and the synthetic monthly precipitation data corresponding to the El Nino years of the time series were generated using Feed Forward Back Propagation Artificial Neural Network (FFBPANN) model and replaced with the original data of the considered time series. Then, both synthetic and original precipitation data sets were compared with each other by considering their statistical characteristics (variance, mean, population, autocorrelation) to find out whether the synthetic and original precipitation data differ from each other or not. As a conclusion, considerable ENSO effects were obtained for the precipitation data of Turkey's Eastern Anatolia Region especially in terms of variance and autocorrelation parameters. These effects should be considered for long term irrigation, drinking water, environmental and energy planning purposes. The results can be extended for all the countries contiguous to Eastern Anatolia to determine "ENSO Affected Regions" in terms of precipitation to be considered in the related studies.

Keywords: Southern Oscillation; FFBPANN; precipitation; Anatolia.

*Presenter

Measuring the Efficiency of OECD Countries In Terms Of Environmental Performance

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Abstract

Data Envelopment Analysis (DEA) is a nonparametric method based on Linear Programming model for measuring the efficiency of Decision Making Units (DMUs). Charnes, Cooper and Rhodes (1978) proposed the efficiency measurement of the DMUs for constant returns to scale (CRS). Later, Banker, Charnes, and Cooper (1984) introduced the variable returns to scale (VRS) efficiency measurement model. In recent years, Data Envelopment Analysis (DEA) has been frequently used for environmental performance evaluations. The aim of this study is to perform the Data Envelopment Analysis (DEA) for measuring the relative efficiency of OECD countries in terms of environmental performance. In the analysis, input oriented models have established and various emission oscillations which are carbon monoxide, sulphur oxides, nitrogen oxides, non-methane volatile organic compounds, PM10 particulates and PM2.5 particulates have considered as input variables, while environmental health index and air quality index have considered as output variables in order to provide better human health and air quality in the future. Australia, Greece, Israel, Japan and New Zealand were omitted from the analysis due to the lack of data in the variables.

Keywords: data envelopment analysis, efficiency, environmental performance

Discrete Time Shock Model with Varying Success Probability

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Abstract

Let us consider a system fails when the time between two consecutive shocks falls below a fixed threshold $\delta \in \mathrm{N}$ and the system's lifetime is measured as the time up to the occurrence of this event. In this study, we consider the interarrival times between $(i-1)$-th and i-th successive shocks follow a geometric distribution with mean $1/p_i$, where $p_i = \theta p^{i-1}, i = 1, 2, \cdots, 0 < \theta < 1, 0 < p \leq 1$. Under the above considerations, the distribution of system lifetime is obtained. Probability generating function and than also moments of system are derived. The proportion estimates of distribution parameters are studied. A numerical example is also presented bu using real data.

Keywords: q−distributions, δ−Shock model, probability generating function

Determination of trace metals on some wild mushroom samples encountered from Black Sea region, Turkey

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Abstract

Trace metal levels (Cd, Cr, Co, Cu, Pb, Mn, Ni, Zn and Fe) in 34 different wild-growing mushroom species from Black Sea region, Turkey were determined by Flame Atomic Absorption Spectrometry (FAAS) after microwave digestion. The contents of trace metals in the mushroom samples were found in the ranges, 0.00–10.88, 1.37–76.41, 0.00–11.30, 1.22–112.04, 0.48–307.80, 4.07–827.54, 0.46–69.37, 1.22–155.96 and 58.27–5315.51 mg/kg dry yeast samples for Cd, Cr, Co, Cu, Pb, Mn, Ni, Zn and Fe respectively. All of these highest metal concentrations were determined in *Clitocybe squamulosa* Iron was determined at the highest concentrations in *Clitocybe squamulosa*, 5315.51 mg/kg. The highest Pb content was observed in *Laetiporus sulphureus* as 307.80 mg/kg dry matter. The highest Cd and Mn content were observed in *Melanoleuca exscissa* as 10.88 and 827.54 mg/kg dry matter, respectively. The highest Cu content was observed in *Boletus subtomentosus* as 112.04 mg/kg dry matter. The highest Cr and Co content were observed in *Lepista nuda* as 76.41 and 11.30 mg/kg dry matter, respectively. The highest Ni and Zn content were observed in *Coprinellus micaceus* as 69.37 and 155.96 mg/kg dry matter, respectively. The levels of metal analyzed in some edible mushroom samples were found to be higher than legal limits. The relative standard deviations (R.S.D.) were found below 10%. The accuracy of procedure was confirmed by certified standard reference material (NIST SRM 1573a Tomato Leaves).

Keywords: Trace metals; Mushrooms; Basidiomycetes; Atomic Absorption Spectrometry; Turkey

*Presenter

Analysis of Non-Periodical Data

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Abstract

In this study, an example was be given on a sample consisting of stock closing prices of the companies included in ISE-100 index. The data are more difficult to analyze when they do not follow a periodic structure. B-Spline Base Functions are preferred in non-periodic situations. The fact that B-splines are flexible and numerically robust and their values are in the band matrix structure increases the widespread use of B-splines. Control of smoothing is the main purpose of the Spline Theory.

Keywords: Smoothing; B-Spline; Non-Periodic Data.

A New Two Decompositions of Continuous Functions

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Abstarct

In this talk, firstly we obtain two characterizations of strong β-I-open sets. Then, we use to give a decomposition of another type of sets this notion. Finally, to give decompositions of open sets in any ideal topological space we define two notions and obtain decompositions of continuity.

Keywords: Strong β-I-open sets, α-I-open sets, Decompositions of Continuity.

A Type of Continuous Functions for Delta-b-open Sets

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Abstract

In this talk, firstly we define a new type of continuity for delta-b-open sets. Then, we obtain several properties and characterizations of it. Finally, we denote to preserving of pasting lemma.

Keywords: Continuous Functions, Delta-b-open Sets, Semi-regularization.

Evaluation of Performance of Simulated Annealing (SA) Algorithm For Multidimensional Knapsack Problems

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Abstract

Multidimensional Knapsack Problem (MKP), which aims to select items into knapsack to attain maximum profit without exceeding the capacities of the knapsack, is a traditional combinatorial optimization problem. This problem can be solved many classical methods such as dynamic programming and greedy algorithm, but it is cannot be solved in polynomial time. That is, it is in the class of NP-hard problems. Therefore, more efficient and productive results can be obtained with metaheuristic methods. In this study, Simulated Annealing (SA) algorithm, which is one of the most popular metaheuristic algorithms, is used to solve MKPs. The choice of the parameters is crucially important for the performance of this algorithm. Consequently, the performance of this algorithm is compared for various values of parameters such as initial temperatures, cooling schedules and stopping conditions through seven different MKPs taken from Operation Research (OR) Library.

Keywords: Metaheuristic, Multidimensional Knapsack Problem, NP-hard, Simulated Annealing.

Comparative Analysis of Multi-Criteria Decision Making Methods: A Case Study of the Countries'Environmental Performance Index

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Abstract

Multi-criteria decision-making (MCDM) is a very significant subject of decision-making theory. In MCDM methods, several alternatives are evaluated with respect to many conflicting criteria for ranking the alternatives. The aim of this study is to compare MCDM methods by evaluating Environmental Performance Index (EPI) of the countries. EPI represents ranking of the countries' performance on high-priority environmental problems. It evaluates two main objectives of environmental policy: Environmental Health and Ecosystem Vitality. Environmental Health which measures environmental stresses to human health consists of health impacts, air quality and water& sanitation. On the other hand, Ecosystem Vitality measures ecosystem health and natural resource management and it includes water resources, agriculture, forests, fisheries, biodiversity& habitat and climate& energy.

In this study, we carry out a comparative analysis of TOPSIS, ARAS and MOORA, which are the some of well-known and widely-applied methods of MCDM, by ranking 180 countries in terms of 19 indicators according to EPI.

Keywords: Multi Criteria Decision Making Methods, Environmental Performance Index, TOPSIS, MOORA, ARAS.

Estimation of Stress-Strength Reliability Based on Upper Record Values for the Exponential Power Distribution

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Abstract

In this study, it is considered maximum likelihood and approximate bayes estimation for the stress-strength reliability defined as R = P(Y < X) based on upper record values when X and Y are two independent Exponential Power distribution with (α_1,β_1) and (α_2,β_2) parameters. R for this distribution and Maximum likelihood estimator of R are obtained. Asymptotic confidence intervals are presented. Further, Bayes estimator of R is obtained using Tierney-kadane approximation under squared error loss function. Finally, mean square errors of these estimators are compared with Monte Carlo simulation method.

Keywords: Upper record values ; Maximum likelihood estimator; Asymptotic confidence interval; Bayesian estimation; Tierney-Kadane Approximation.

Parameter Estimation of Alt-Exp Distribution under Progressive Censoring

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Abstract

In this study we investigate the maximum likelihood estimation of parameters of Alt-Exp distribution based on progressively censored data. It is observed that the maximum likelihood estimates can not be obtained in closed form. The asymptotic confidence intervals and bootstrap confidence intervals are constructed. A simulation study is performed to see the performance of the estimates and the coverage probabilities of the confidence intervals.

Key words: Alt-Exp distribution, progressive censoring, maximum likelihood method, bootstrap confidence interval.

Discrete δ-Shock Model of Order k

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Abstract

Let us consider that a component or a system may subject to shock with a probability at time n=1,2,… . Let "1" denote that there is a shock and "0" denote that there is no shock. Hence, a 0-1 sequence will be occurred for such system. In any part of this sequence, if the number of trials from a shock to next shock is less than a threshold value δ then there is a δ-shock. In this study, it is considered that a system will fail with k consecutive δ-shock. Such a system can be called "δ-shock model of order k". We obtain the probability mass function of the system's lifetime.

Key words: Binary trials, combinatorics, discrete distributions, run statistic, δ-shock model

Some Properties of New One Type Zero-Divisor Graphs

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Abstract

In this study, we show some graph parameters and graph numbers over the zero-divisor graph Γ(R) where $R = Zp^2 \times Zq^2$, p and q are primes.

Keywords: graph; zero-divisor graph; algebraic graph.

Relatıonshıp Between Labor Partıcıpatıon, Educatıon And Growth In Women In Turkey: Ardl Border Test

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Abstract

Social structure and society's perspectives for women in our country are among the factors that affect viewpoint to women in the workforce. With the beginning of this transformation, the place of woman in working life is increasing. Workforce participation rate are an important variable in terms of the development of the country. It is also true that women will contribute positively to the economy of the country as they start to participate in the workforce. It is a particularly important factor in emerging economies. Women's participation in the workforce is also an important element in the development of the Turkish economy. However, participation in the workforce in the Turkish Economy is not at the desired level. This rate is increasing day by day in Turkey, which has a relatively low compared to European countries.

The aim of this study is to demonstrate the long-term relationship between educated and uneducated women and growth. Firstly, in order to determine the stationarity of the series, the ADF unit root test was applied and then ARDL boundary test approach was applied. We used monthly data obtained from TSI between 2005 and 2016. As a result of the study, it is found that there is a cointegration relation between the series. It was observed that 1% increase of the participation of the educated women in the workforce causes the growth to increase 0.08%, while the uneducated women increased by 0.15%.

Key Words: Participation in the female workforce, Economic growth, Women's education, ARDL.

A Decision Support System for the Prevention of Urban Crime

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Abstract

Crime is a behaviour problem that has existed from past to present and will continue to exist. The crime committed in a society causes certain costs to arise. These crime costs affect all individuals in society. Crime must be controlled and its damage must be minimized. In the scope of this study, it was aimed to prevent urban crime by making effective police assignments on the basis of the city. Crimes committed in the urban environment are called urban crimes. A decision support system has been developed to prevent urban crime. This allows the decision maker to try different scenarios. In the developed decision support system, there are data entry, crime prediction model and crime prevention model parts. In the crime prediction model, urban crime numbers were estimated using some estimation methods. With the crime prevention model was carried out police assignments based on estimated crime numbers. At the end of the study, thanks to the developed decision support system, total city-based crime costs and crime counts have been reduced.

Keywords: Decision Support Systems; Crime Prevention; Crime Prediction; Optimization.

*Presenter

Time-Dependent Structural Analysis for Repairable Consecutive-k-Out-Of-n: F Systems with Obtained State Transition Probabilities

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Abstract

A consecutive-k-out-of-n: F system consists of an ordered sequence of n components such that the system fails if and only if at least k consecutive components fail. The system can be classified with respect to the logical or physical connections among components as either linear or circular. If we consider that components are repairable, then such system is called a repairable consecutive-k-out-of-n: F system. Recently, extensive research has been carried out on consecutive-k-out-of-n: F system. In these papers, the working time and the repair time of the components are assumed to be exponentially distributed. The state transition probability matrix of the system is derived by using the definition of generalized transition probability and then some important reliability indices such as availability, rate of occurrence of failure, mean time between failures, reliability and mean time to first failure are studied. Based on the classical model assumptions, the state of the system at time t, denoted by $N(t)$, varies depending on the n and k variables. For a linear consecutive-2-out-of-5: F system, we have the following possible values:

$$N(t)=\begin{cases}0, & \text{if at time } t, \text{all components work, the system works}\\ -1, & \text{if at time } t, \text{one components fail, the system works}\\ -2, & \text{if at time } t, \text{two components fail, the system works}\\ -3 & \text{if at time } t, \text{three components fail, the system works}\\ 2, & \text{if at time } t, \text{two components fail, the system fails}\\ 3, & \text{if at time } t, \text{three components fail, the system fails}\\ 4 & \text{if at time } t, \text{four components fail, the system fails}\end{cases}$$

The system may be in one of the aforementioned states at time t. Our purpose in this paper is to analyse the time-dependent structure of the system under the assumption that the state of the system is known at time t. We at first derive the state transition probability matrices of the linear and circular F systems and then develop a new method by using eigenvalues of the matrices. A linear and circular systems with five components are used as an example.

Keywords: linear (circular) consecutive-k-out-of-n: F system; state transition probability matrix; time-dependent structure of the system

The Relatıonshıp of Energy Consumptıon and Growth in the Context of Economy of Turkey

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Abstract

The energy consumption on a global scale gradually increases due to urbanization, industrialization and population growth. Therefore energy takes place among the most important agenda items of the countries. Along with the rapid and strong growth performance accounted in recent years especially energy has become more important for Turkey as well. The causal relationship between energy consumption and growth in this study was analyzed with the help of Johansen Cointegration for the Turkish economy based on the period of 1980-2015 years. Obtained findings have demonstrated that there is no long-term relationship between variables.

Keywords: Energy Consumption, Economic Growth, Turkish

An Actuarial Overview of Child Labor

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Abstract

Many children have to work rather than going to school due to social, economic and cultural reasons in Turkey and studies show that working children's basic right of education is taken away. We aim to design a government-supported insurance product based on the actuarial balance principles which ensure the involvement of child workers in education system in this paper. Education costs such as clothing (school uniform, shoes, etc.), stationery materials, nutrition and service fees are taken into account as the basic requirements for the calculation of the premiums in this model. In addition, the number of individuals who will benefit from the fund has also been determined based on the total income per household and the total number of individuals in the household. Results of Educators Trade Union Research Center (2015) "Student's cost to parent" and changes in costs over the years in Turkey are considered in the cost calculation. In modeling, the cost amount is assumed to have an exponential distribution which is one of the light-tailed distributions. In this study, n-year temporary life annuity, m-year deferred n-year temporary life annuity, the present value of the annuity-immediate and life insurance mathematics methods are applied because the costs arise during the education of a child would include survival possibilities. Turkish Female-Male Life table (TRH-2010) with 1.8% interest rate is used to predict the future life expectations and for survival probabilities. In this calculation, rises in the costs due to the price inflation over the years have been updated using the Turkey Consumer Price Index (TUFE).

Key Words: Child Labor, Actuarial Balance, Annuity, Life Insurance Mathematics

*Presenter

The Measurement of Directional Dependence for Some Asymmetric Copulas

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Abstract

In this study, directional dependency measures are obtained for some copula functions in order to explain the potential asymmetricity in financial data. It is shown that directional dependence coefficients obtained by the copulas give a clear information about the existence of dependence driven asymmetry situations. Here, firstly, some asymmetric copulas are derived for the Archimedian type copulas. Then, the directional dependence measures based on these copulas are obtained for various parameter values using the asymmetric copula functions. The results are presented with some tables and graphs. Implications of the results are presented for the financial data of several countries. In this line, relations between the exchange rates and stock indices of two countries are investiagated through the directional dependence measures for the explanation of before and after conditions regarding the occurrence of an important event like a financial crisis.

Keywords: Dependence, directional dependence, copula, asymmetric copula

Smallest Pareto Confidence Intervals and Regions under Progressive Type-II Censoring

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Abstract

In this paper, the constrained optimization problems are stated and solved in order to find the optimal confidence intervals and regions for the parameters of the two-parameter Pareto distribution under progressive-Type II censoring. These intervals and regions are valid for complete data, and also for Type-II and progressive censoring. Two numerical examples are included for illustrative purposes. Further, some applications in hypothesis testing and the construction of confidence bands are also provided.

Keywords: Constrained optimization; Confidence regions, Lagrange method; progressively censored data.

SELÇUK ÜNİVERSİTESİ

A Novel Solution Procedure for Pdes by Laplace Differential Transform Method

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Abstract

In this study we introduce the Laplace Differential Transform Method (LDTM) combined the form of the Laplace Transform and Differential Transform Method (DTM) to obtain approximate analytical solutions of the partial differential equations. To illustrate the high accuracy and efficiency of the proposed method, some examples are given. In addition, the numerical results show that the LDTM is easy to apply and calculate for solving PDEs.

Keywords: Partial differential equations, Laplace differential transform method, series solutions.

Determining the Factors Affecting Profitability by Sectors

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Abstract

It is a fact that profitability differs from sector to sector. Using the data from the Public Disclosure Platform in 2011, 2012 and 2013, the factors affecting the profitability of the companies in the different sectors traded in the BIST were determined by cohort analysis. Companies in the same sector were categorized as a cohort group in the analysis. In the study, leverage, liquidity, activity, market value, book value, business size, business risk, growth opportunities and non-debt tax shields (NDTS) as factors that may affect the profitability of the enterprise were used. By comparing the sectors, the most effective ratios affecting profitability for each sector are determined by years.

Keywords: profitability, sector, bist

Generalized Linear Model (*GZLM*) Approach for Investigating Energy Concept in the Aspect of Economic Indicators

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Abstract

In this study, European Union (*EU*) countries energy data are modelled by using generalized linear model (*GZLM*) approach. The response variable is taken as energy balance. The importance of energy balance is to explain the relative weight of different fuels in their contribution to the economy. The explanatory variables are taken as in the main headings of international trade, foreign direct investment, energy prices, and also supply, transformation and consumption of energy. For this aim, *GZLM* for continuous response variable is constituted on these explanatory variables by using different link functions. Also the advantage of modelling energy data by *GZLM* over traditional general linear model is mentioned comparatively in the aspect of different information criterias in this study.

Keywords: Energy; generalized linear model; link function; information criteria.

Some reliability properties of Marshall-Olkin bivariate exponential distribution

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Abstract

In this article, we investigate some reliability properties of series and parallel systems under Marshall-Olkin bivariate exponential model introduced by Marshall and Olkin (1967). Specifically, we study the reliability functions, the moments, the mean residual lifetime functions for series and parallel systems.

Key words: Reliability, Marshal-Olkin bivariate exponential distribution, series and parallel systems.

Outlier Tolerance of Robustified GAM Models

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Abstract

As in parametric regression, the presence of outliers in a dataset distorts the model parameters and inflates the residual sum of squares of the model in fitting generalized additive models (GAMs). As a modification of the ordinary generalized additive model techniques, outlier-tolerant GAM fitting methods, the robustgam and rgam packages in R have been developed. The rgam algorithm, uses those derived from robust quasi-likelihood equations in place of the maximum likelihood based weights in the local scoring algorithm, whereas, the robustgam works by decomposing the M-type problem into a sequence of additive model fitting problems. In literature, both these methods were compared with the ordinary GAM fitting mechanisms. In this paper, using the ordinary gam models, 'gam' and 'mgcv' models as a base, the two robustified GAM methods were fitted to a simulated data generated using different functions and which comprises a specific proportion of outliers. The mean square error (MSE) was considered for comparison of their performance. Furthermore, the run time elapsed was taken in to consideration and rgam was found to take longer.

Keywords: Generalized Additive Models (GAMs), rgam, robustgam, Outlier

Determination of shear capacity of spiral columns with artificial neural network

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Abstract

Non-linear solutions in engineering problems need to be obtained with proper, reliable and using fast method. In this direction, successful results have been obtained in artificial neural networks (YSA) for the solution of nonlinear problems in engineering applications, and this is the preferred alternative model. In this study, shear force carrying capacities of spiral columns with different engineering characteristics were determined by YSA technique with the data set compiled from the literature and the results were compared with the experimental results, and the performance of ANN was investigated. In the scope of the study, the results of a total of 79 spiral column experiments made by different researchers obtained from the literature have been utilized. 50 of these data sets were used for training and remaining 29 were used for testing. The results show that, the shear force carrying capacity of the columns can be estimated with a high success rate via ANN. In addition, the success of ANN in this area has been tested with a verification set consisting of a 7 different mechanical properties spiral column tests compiled from the literature. The convergence success of the ANN and theoretical approaches to the experimental results was evaluated by comparing the shear force carrying capacities of the columns in the verification set with the theoretical formulas in current reinforced concrete construction regulations (ACI-318, TDY-2007).

Keywords: Algorithm, Reinforced Concrete, Spiral Column, Shear Capacity, Artificial Neural Networks

Comparison of Artificial Neural Network and Data Mining Techniques for Prediction of 2017 Uefa Champions League

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Abstract

Nowadays, football which is a sport branch that followed by masses increases its popularity day by day due to both the economic magnitude either the interest of people from all walks of society. There are many measurable and unmeasurable factors that can affect the result in football competitions as in many sport branches. In this study, it was predicted result of 15 elimination rounds including 8 2nd round, 4 quarter final, 2 semi-final and 1 final will be played in 2017 UEFA Champions using artificial neural networks, support vector machine and K-nearest neighbor algorithm methods. The statistical data of 7 seasons played between 2010-2016 which is obtained from "whoscored.com". This host regularly publishes soccer statistics are compiled and used as training data. In the last part of the study, the successes of the prediction methods were compared.

Keywords: Artificial Neural Network, Support Vector Machine, K-nearest neighborhood, Classificiation

A Test for Means of *k>2* Normal Distributed Group

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Abstract

In this study, a test consisting of random variables with Student's t-distribution is proposed for testing the equality of means with normal distributed group ($k > 2$). By using a new test, a critical values table is constituted at certain critical levels. The power values and Type-I errors of the new test are compared with those of the F test. The comparisons of the power values and Type-I errors are presented with tables and graphs.

Key Words: F test, Power value, Student's t-distribution Type-I error,

Bi-periodic Fibonacci Matrix Polynomial

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Abstract

In this study, we introduce bi-periodic Fibonacci $\{F_n(a,b,x)\}_{n\in\mathbb{N}}$ matrix polynomial as

$$F_n(a,b,x)=\begin{pmatrix}\left(\frac{b}{a}\right)^{\varepsilon(n)}q_{n+1}(a,b,x) & \frac{b}{a}q_n(a,b,x)\\ q_n(a,b,x) & \left(\frac{b}{a}\right)^{\varepsilon(n)}q_{n-1}(a,b,x)\end{pmatrix}$$

where $q_n(a,b,x)$ is nth bi-periodic Fibonacci polynomial and $\varepsilon(n)=n-2\left\lfloor\frac{n}{2}\right\rfloor$. Then, we give some properties for this generalized matrix polynomial such as the determinant, generating function and Binet formula. Finally, we express that it is obtained a new generalization for the polynomials, matrix sequences and number sequences that have the similar recurrence relation in the literature.

Keywords: bi-periodic Fibonacci matrix polynomial; bi-periodic Fibonacci matrix sequence; Binet Formula; generating function.

A Compound Distribution and Properties

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Abstract

In this paper, we introduce a new lifetime distribution compounding Chen and Weibull distributions by using method of Oluyede et al. (2016). Some distributional properties such as moments, quantiles, hazard function and etc. are investigated. Maximum likelihood method is considered to estimate the distribution parameters. A real data example is also given.

Kewwords: Compounding, lifetime distribution, maximum likelihood

References

Oluyede, B. O., Foya, S., Warahena-Liyanage, G., & Huang, S. (2016). The Log-logistic Weibull Distribution with Applications to Lifetime Data. *Austrian Journal of Statistics, 45*(3), 43.

A New Discrete Distribution based on Markov dependent 0-1 Sequence with Rewards

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Abstract

Recently, Eryilmaz et al. (2016) defined two new waiting time random variables with reward concept and obatined their distributions based on independent trinary sequence. In this paper, a new discrete distribution is introduced through the same idea of Eryilmaz et al. (2016) under markov dependent binary sequence.

Keywords: Binary sequence, Markov dependent, discrete distribution

References:

Eryılmaz S., Gong M., Xie M. (2016), Generalized sooner waiting time problems in a sequence of trinary trials, Statistics & Probability Letters, 115, pp. 70-78.

Statistical Inference on Cpm

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Abstract

In this study, we focus on the paper of Xekalaki and Perakis (2004). They have studied on constructing confidence intervals (CIs) for on of the process capability index CPM. In addition to their results, some CIs are included in the study. The coverage probabilities and length of intervals are tabulated by simulation study and CIs are compared.

Keywords: process capability indices, approximate confidence intervals, simulation study

References:

A New Method for Constructing Confidence Intervals for the Index CPM Quality and Reliability Engineering International, 20(7), 651-665, (2004)

Comparison of Algorithms for The Determination of the soil Thermal Diffusivity

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Abstract

Soil heat diffusivity is an important physical parameter affecting soil temperature. Several algorithms have been proposed to estimate soil thermal diffusivity. Soil heat diffusivity is determined in laboratory and field by monitoring the soil temperature. Commonly used methods for finding this parameter is based on via application of analytical and numerical solution of heat conduction equation to data from field trials. This study presents comparisons between six algorithms used in the calculation of apparent thermal diffusivity (κ) of the topsoil measurements which conducted at Çumra site. Soil temperatures were measured at dephts of 0.05 m and 0.10 m. We modeled soil temperature and κ using six different methods; namely layer methods (i.e. Amplitude, Phase, Arctangent, Logarithm), point1 method, and point2 method. The point methods outperformed the layer methods in all the cases. The layer method over predicted the soil temperature in all depths under all the soil surface conditions. Point 1 and point 2 methods estimated more reasonable values and their results were consistent in majority of the cases. This success of the point methods was attributed to the initial conditions on soil surface that they employ. The layer method uses the initial conditions $T(\infty, t)=0$, while the point methods use initial conditions $\partial T(L,t)/\partial x=0$. In addition, the analytical solutions used in point methods better account to the heat flow dynamics in soils.

Keywords: Soil thermal properties, Soil heat capacity, Soil heat diffusivity, Initial boundary conditions

A Fieldwork Aimed at Analysis of Consumer Purchase Decision Process

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Abstract

As one of the important part of our modern management understanding, providing customers' desire and needs and to understand irrational behaviors, atitudes that can adapt changing and developing environmental conditions thoroughly make their existence felt. From this point of view, for a business, it doesn't matter from which sector it exists, concepts that show postmodern quality like consumer behavior became a powerful competitive tool by becoming a essential value. In fact, recently it has been mentioned how much and from which dimension consumers are affected from different factors. In this respect, from the perspective of increasing competition and technologic movements, the study that consumers decisions parameters are tried to be brought to light, the questions like how deciding process occurs, what are the steps of process and according to which factors the reasons in consumers mind during the decision process forms, will tried to be answered by analysing the collected datas.

Keywords: Consumption, Consumer, Consumer Deciding Process

Effects of Ozone on Egg Weight Loss and Hatching Traits in Japanese Quail (*Coturnix coturnix japonica*) Eggs[1]

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Abstract

The aim of this study was to establish the effects of ozone on hatchability of set eggs and hatchability of fertile eggs. A total of 825 fresh hatching quail eggs were randomly divided into 5 groups. Eggs from the first group were sprayed with benzalkonium chloride (Control), and the second, third, fourth, and fifth groups were applied with ozone at 4 doses: 1, 3, 5, and 7 ppm for 30 minutes. There were no significant differences between treatments for egg weight loss, hatchability of set eggs, and hatchability of fertile eggs. Results of the present study indicated that ozone could be an alternative hatching egg disinfectant versus a chemical disinfectant, without adverse effects on egg weight loss and hatching traits.

Key words: Ozone, hatchability, sanitizer, hatching eggs

[1] Poster Presentation

*Presenter

Effects of Ozone on Eggshell Microbial Load in Japanese Quail (*Coturnix coturnix japonica*) Eggs[1]

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Abstract

The aim of this study was to establish the effects of ozone on total aerobic mesophilic bacteria and coliform load. A total of 825 fresh hatching quail eggs were randomly divided into 5 groups. Eggs from the first group were sprayed with benzalkonium chloride (Control; C), and the second, third, fourth, and fifth groups were applied with ozone at 4 doses: 1 (O1), 3 (O3), 5 (O5), and 7 (O7) ppm for 30 minutes. The lowest total aerobic mesophilic bacteria and coliform values were found in O7 group during incubation period. No significant differences were observed in total aerobic mesophilic bacteria and coliform values between C and Ozone treatment groups. Results of the present study indicated that ozone could be an alternative hatching egg disinfectant versus a chemical disinfectant.

Key words: Ozone, mesophilic bacteria, coliform, sanitizer, incubation

[1] Poster Presentation

*Presenter

Include or Exclude a Constant Term in Regression Analysis[1]

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Abstract

In linear regression analysis, including constant term have always been a question. It can be said that, generally, including the constant term depends on the research. But it must be known that the estimation of parameters differ according to involvement of the constant. Most regression models include a constant term (i.e., an "intercept"), since this ensures that the model will be unbiased, in other words, the mean of the residuals will be zero. By including a constant, one degree of freedom for error will be lost, but it's a small price to pay for the protection against bias. If an intercept term exists in the model, the least squares estimate of the slope parameter will be unbiased. It does not depend on the true value of the intercept, it can be zero or not. The answer of why both model's and residual's sum of squares inflate is that the model is predicting the sum of squares left over after removing the intercept. As a result of this, R^2 and even adjusted R^2 increase. We compare the results of models that include intercept and don't include intercept term on hypothetic data sets. The approaches are demonstrated via both simulation studies. Simulation-based investigation is carried out under various different scenarios. Results from the simulation study will be presented. We will discuss scenarios in which case they are advantageous. All statistical analyses were conducted using R version 3.3.2 (R Foundation for Statistical Computing, Vienna, Austria).

Keywords: intercept; regression; sum of squares; zero-constant.

[1] Poster Presentation

Graphical Markov Models for the Categorical Data Analysis[1]

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Abstract

Markov random fields or undirected graphical models are widely used for modeling, visualization, inference, and exploratory analysis of multivariate data with wide-ranging applications. Graphical models are models based on graphs in which nodes represent random variables, and the edges represent conditional independence assumptions. Hence they provide a compact representation of joint probability distributions. Graphical Markov models started to be developed after 1970 as special subclasses of log-linear models for contingency tables and of joint Gaussian distributions, where conditional independence constraints are imposed such that conditioning is on all the other variables. The study of these models is an active research area, with many questions still open. In this study, how graphical Markov models emerged in the last 40 years are described. Then, interpretations are illustrated with an application. Furthermore, some of the more recent, important results for sequences of regressions are summarized.

Keywords: graphical models; Markov property; categorical data analysis.

[1] Poster Presentation

Deterministic and Stochastic Models of Infectious Diseases[1]

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Abstract

Infectious diseases are an important and cause of human illness and mortality across the world. The effectiveness of sanitation, antibiotics, and vaccination programs created a confidence in the 1960s that infectious diseases would soon be eliminated. However, infectious diseases have continued to be the major causes of suffering and mortality in developing countries. Moreover, infectious disease agents adapt and evolve so that new infectious diseases have emerged and some existing diseases have reemerged. The emerging and reemerging diseases have led to a revived interest in infectious disease modelling. Some well-known models of infectious disease are deterministic. General models, such as the SIR (susceptible, infective, recovered) model have proven useful in ascertaining gross factors affecting rate of growth and final size of an epidemic. However, the nature of epidemic growth and spread is generally stochastic and hence, stochastic models have become important tools in analyzing the spread and control of infectious diseases. In this study, the properties of some stochastic epidemic models are investigated.

Keywords: epidemiology, infectious diseases, stochastic models, SIR.

[1] Poster Presentation

SELÇUK ÜNİVERSİTESİ

Efficient Class of Estimators for Population Variance Using Two Auxiliary Variables[1]

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Abstract

In this paper, we suggest a family of estimators using the information of two auxiliary variables for the estimation of the population variance in the simple random sampling method. The asymptotic expressions for the bias and mean squared error (MSE) of the suggested family of estimators have been derived up to the first order of approximation. We show that the MSEs of suggested estimators are smaller than the MSEs of the classical estimators under determined conditions obtained in theory. We also demonstrate the performances of the suggested estimators by a numerical application.

Keywords: variance estimator; auxiliary information; mean squared error; efficiency.

[1] Poster Presentation

Sliced Inverse Regression for Tobit Model Estimation[1]

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Abstract

The Tobit model is used to describe the relationship between a non-negative dependent variable and an independent variable. In this model, the observed response is not the actual response and there is a latent variable in order to get the unobservable cases into the model. Due to deal with such censored data, the Tobit model can be referred as a special form of censored regression model. In the estimation of Tobit model coefficients, maximum likelihood method is commonly used since its estimates are consistent. The weakness of this method can arise when the normality assumption are not satisfied. For this situation, sliced inverse regression (SIR) from the methods of sufficient dimension reduction can be one way to estimate the coefficients. SIR is a tool for dimension reduction and its aim is to show only the most important directions of the data. Thus, it gives an opportunity to cope with high dimensional data in multivariate statistics. The main properties of SIR is that it uses inverse regression curve and partitions data according to response variable into slices. Actually, in Tobit model estimation via SIR, doubling slicing is applied to deal with a censored data and other steps of SIR remain the same as a usual. Under normality, SIR can give strong estimators as well as maximum likelihood method. Besides, under the failure of this assumption and the homoscedastic pattern, SIR still gives strong estimators. In this study, SIR model application is given on the real data.

Keywords: censored data; dimension reduction; maximum likelihood.

[1] Poster Presentation

*Presenter

SELÇUK ÜNİVERSİTESİ

A Note on Norms of Some Special Matrices[1]

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Abstract

Norms on matrices are useful quantities which can give important information about a matrix and essential for error analysis of numerical linear algebraic algorithms. In this paper, we investigate some norms for some special matrices, mostly by employing and combining some basic techniques of linear algebra and some matrix structure.

Keywords: Special matrices; Norms of matrices.

[1] Poster Presentation