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Editor

Christos H Skiadas

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Preface

It is our pleasure to welcome the guests, participants and contributors to the International Conference (ASMDA 2017) on Applied Stochastic Models and Data Analysis and (DEMOGRAPHICS2017) Demographic Analysis and Research Workshop.

The main goal of the conference is to promote new methods and techniques for analyzing data, in fields like stochastic modeling, optimization techniques, statistical methods and inference, data mining and knowledge systems, computing-aided decision supports, neural networks, chaotic data analysis, demography and life table data analysis.

ASMDA Conference and DEMOGRAPHICS Workshop aim at bringing together people from both stochastic, data analysis and demography areas. Special attention is given to applications or to new theoretical results having potential of solving real life problems.

ASMDA 2017 and DEMOGRAPHICS 2017 focus in expanding the development of the theories, the methods and the empirical data and computer techniques, and the best theoretical achievements of the Applied Stochastic Models and Data Analysis field, bringing together various working groups for exchanging views and reporting research findings.

We thank all the contributors to the success of these events and especially the authors of this Proceedings Book. Many thanks to the honorary guest Gilbert Saporta and the Colleagues contributed in his special session on data analysis. Special thanks to the Plenary, Keynote and Invited Speakers, the Session Organisers, the Scientific Committee, the ISAST Committee, Yiannis Dimotikalis, Aristeidis Meletiou, the Conference Secretary Mary Karadima, and all the members of the Secretariat.

May 2017

Christos H. Skiadas
Conference Chair

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Plenary/Keynote Talks
For ASMDA Conference

In celebration of Gilbert Saporta's 70th birthday and in honour of his contributions to Applied Statistics and Data Analysis and his support to ASMDA activities

Gilbert Saporta
Emeritus Professor of Applied Statistics
Conservatoire National des Arts et Métiers (CNAM)
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Hamilton, Ontario, Canada

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Haskayne School of Business,
University of Calgary, Canada and
Centre for Applied Financial Studies,
University of South Australia,
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University College London, UK

For Demographics Workshop

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Montpellier, France

Rebecca Kippen
Rural Health,
Monash University
Victoria, Australia

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capability to discriminate between looking at forward and backward directions in time series. The Gini creates two bi-directional Gini autocorrelations (and partial autocorrelations), looking forward and backward in time, which are not necessarily equal. The difference between them may assist in identifying models with underlying heavy-tailed and non-normal innovations. Gini-based test and Gini-based correlograms, which serve as visual tools to examine departures from the symmetry assumption, are constructed. Simulations are used to illustrate the suggested Gini-based framework and to validate the statistical test. An application to a real data set is presented.

Keywords: Autocorrelation; Autoregression; Gini correlation; Gini regression; Moving block bootstrap; Time reversibility.

Some Extensions in Space-Time LGCP: Application to Earthquake Data

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[2]University Jaume I, Spain

In this paper we aim at studying some extensions of complex space-time models, useful for the description of earthquake data. In particular we want to focus on the Log-Gaussian Cox Process (LGCP, [1]) model estimation approach, with some results on global informal diagnostics. Indeed, in our opinion the use of Cox processes that are natural models for point process phenomena that are environmentally driven could be a new approach for the description of seismic events. These models can be useful in estimating the intensity surface of a spatio-temporal point process, in constructing spatially continuous maps of earthquake risk from spatially discrete data, and in real-time seismic activity surveillance. Moreover, covariate information varying in space-time can be considered into the LGCP model, providing complex models useful for a proper description of seismic events. LGCP is a Cox process with $\Lambda = expS(x)$, where S is a Gaussian process. This construction has some advantages, related to the multivariate Normal distribution features, since the moment properties $\Lambda(x)$ are inherited by the Cox process. In particular, both estimation and diagnostics, can deal with some higherorder properties [2], expressed for instance by the intensity and the pair correlation function of the LGCP.

Keywords: LGCP, Space-time Point Processes, second-order functions, diagnostics.

References:

[1]. Moller J, Syversveen AR, Waagepetersen RP. Log Gaussian Cox Processes. Scandinavian Journal of Statistics, 25(3), 451-482. 1998.

[2]. Baddeley AJ, Moller J, Waagepetersen R. Non- and Semi-Parametric Estimation of Interaction in Inhomogeneous Point Patterns. Statistica Neerlandica, 54, 329-350. 2000

Acknowledgements: *This paper has been supported by the national grant of the MIUR for the PRIN-2015 program, \Prot. 20157PRZC4 – Research Project Title Complex space-time modeling and functional analysis for probabilistic forecast of seismic events. PI: Giada Adelfio"*

Doubly Recurrent Algorithms for Mixed Power-Exponential Moments of Hitting Times for Semi-Markov Processes

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New doubly recurrent algorithms for computing mixed power-exponential exponential moments of hitting times and accumulated rewards of hitting type for semi-Markov processes are presented. The algorithms are based on special techniques of sequential phase space reduction and recurrence relations connecting mixed power-exponential exponential moments of hitting times. Applications are discussed as well as possible generalizations of presented results and examples.

Keywords: Semi-Markov process, Hitting time, Mixed power-exponential moment, Recurrent algorithm.

Asymptotic Recurrent Algorithms for Nonlinearly Perturbed Semi-Markov Processes

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Recurrent algorithms for construction of Laurent asymptotic expansions for power moments of hitting times for nonlinearly perturbed semi-Markov processes are presented. These algorithms are based on a special technique of sequential phase space reduction, which can be applied to processes with an arbitrary asymptotic communicative structure of phase spaces. Asymptotic expansions are given in two forms, without and with explicit upper bounds for remainders. A special attention is paid to nonlinearly perturbed birth-death-type semi-Markov processes. Applications to nonlinearly perturbed queuing systems,

information networks, and models of stochastic systems of biological nature are discussed.

Keywords: Semi-Markov process, Nonlinear perturbation, Hitting time, Power moment, Laurent asymptotic expansion.

Simulation Before, During, and After a Clinical Trial: A Bayesian Approach

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Simulation of a clinical trial gives you answers to important economic, logistical, or scientific questions about the trial when some of the features are difficult to characterize with perfect precision. A Bayesian approach with informative priors offers a flexible framework for trial simulation. It provides a seamless transition from simulation prior to the trial to simulation during the trial itself. Although informative priors are controversial, you can avoid perceptions of bias by restricting the informative priors to clinical trial features that are independent of your research hypothesis. You can protect your interim predictions against unrealistic prior beliefs by implementing the hedging hyperprior, a simple hyperdistribution that downweights the strength of the prior when there is a discrepancy between the prior distribution and data observed during the trial itself. The Bayesian approach also gives you a simple post mortem analysis after the trial ends. You can compute percentile values by plugging the point estimates from the actual clinical trial data into the corresponding prior distributions. Over multiple trials, a deviation in these percentiles from a uniform distribution indicates biased specification of the informative priors. The Bayesian approach to trial simulation will be illustrated using various patient accrual models.

Keywords: hedging hyperprior; informative prior distributions; Markov Chain Monte Carlo; patient accrual.

Estimation of the Healthy Life Expectancy in Italy through a Simple Model based on Mortality Rate

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We use an advanced methodology based on the mortality rate of a population to explore the healthy life expectancy (HALE) estimates of the World Health Organization (WHO) from the Global Burden of Disease Study. First we calculate the loss of healthy life year estimator (LHLY) and then the healthy life expectancy (HLE). We use the full life tables from the Human Mortality Database (HMD). Our estimates are compared with the HALE estimates for Italy and other countries. Another direct estimation based on the *mx* and *qx* quantities provided from the Life Tables is also introduced and tested.
Analysis of the health situation in Italy males and females is presented along with the healthy life expectancy estimates.

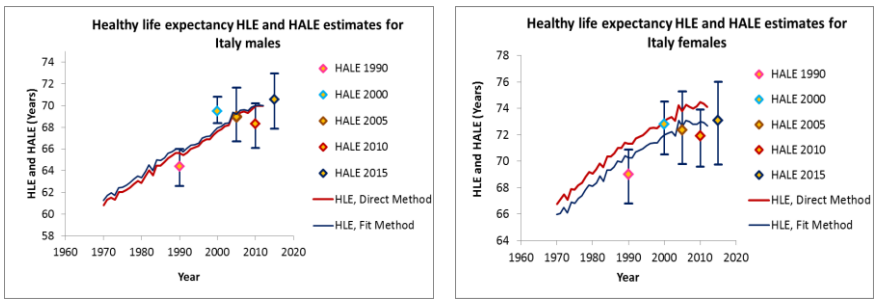

Fig. HLE estimates and HALE estimates and confidence intervals for Italian males (left) and females (right)

Keywords: Healthy life expectancy, World Health Organization, Global burden of disease study, Life tables, Healthy life expectancy in Italy, Healthy life years lost, WHO, HALE.

Further Exploration of the Existence of a Limit to Human Life Span

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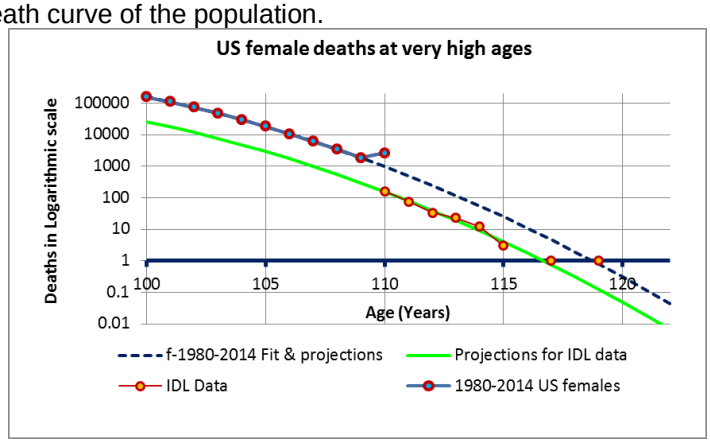
The probability of dying is a distribution with a special tail to the right. The tail is approaching zero for a high theoretical age. Theoretically the probability of dying at high ages could be very small and it is hard to

appear such large population size to achieve at least one survival at very high ages. The question addressed related to a limit of human life span is mainly influenced by the population needed to achieve a certain limit. For a population of infinite size the probability of at least one survival at a very high age is possible. However, for the limited global population an upper limit could exist at least of a probabilistic point of view. The decline of the probability of dying at high ages is very fast. It exponentially reduces the chances of survival to high ages so that, following our estimates, after estimating the age year for the last survival, achieving one more survival at the next year of age, we need approximately a ten times higher population.

We provide a data transformation method followed by fitting and the related projections are important tools to find the time course of the super-centenarians development. A model application method is also applied to cross-validate the previous estimates in the extreme right of the death curve of the population.



The fit and the projections are illustrated in the figure above in logarithmic scale. The female deaths provided from the Human mortality Database (HMD) for 110+ for 1980-2014 are 2576 whereas the projected are 1930 covering the 75% of the total sum. The provided 309 deaths from IDL data is the basis for finding the trajectory for this case presented by the green line in the same figure. We multiply by 0.16 the HMD projections. The used methodology provides a good method to locate the trajectory for the IDL data whereas it can estimate some extra points placed outside this trajectory by means the case surviving at 119 years of age. The latter case is within the space located by the upper curve which is produced from the 1980-2014 population size that is 39.617.539 and 2.576 deaths for 110+ years of age. The super centenarians' deaths from IDL data base refer to a population size of 6.338.806 that is close to a five year sum of death females in US.

We thus have a method to relax the debate rased after the publication of the paper in Nature by Xiao Dong, Brandon Milholland & Jan Vijg on "Evidence for a limit to human lifespan".

Keywords: Centenarians, super centenarians, HMD, Human life span limit, Fitting method, Projection method, Data transformation method.

References:

[1]. Skiadas, Charilaos and Skiadas, Christos, H. Development, Simulation and Application of First Exit Time Densities to Life Table Data, *Communications in Statistics* 39, 2010: 444-451.

[2]. Skiadas, Christos, H. and Skiadas, Charilaos. Exploring the State of a Stochastic System via Stochastic Simulations: An Interesting Inversion Problem and the Health State Function. *Methodology and Computing in Applied Probability* (2015, Volume 17, Issue 4, pp 973–982).

[3]. Xiao Dong, Brandon Milholland & Jan Vijg. Evidence for a limit to human lifespan, *Nature*, Vol 538, 2016:257-259.

Comparing Generalized Mixed Effects Models with RE-EM Tree Method in Corporate Financial Distress Prediction

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An idea of our contribution is based on the previous studies that show a strong relationship between financial health and financial ratios of companies. Both cross-sectional or longitudinal financial data sets are analyzed in order to describe this relationship. We have chosen to investigate latter data set type collected over a several consecutive years. A longitudinal financial ratios database is used to predict financial health of companies.

To carry out our analysis we apply generalized mixed effects regression models in the statistical system R, namely the functions glmer() from lme4 package. The results are compared with those obtained by using RE-EM tree method, which combine the advantages of linear mixed models and classical CART algorithm by Leo Breiman. This method is implemented in REEMtree package in R.

Keywords: Generalized Mixed Effects Models, Financial Health of Companies, RE-EM tree.

Interpolation using Local Iterated Function Systems

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Iterated function systems are used in order to construct fractal functions. Local iterated function systems are important generalization of iterated function systems. Also the real data interpolation methods can be generalized with fractal functions In this article using the fact that graphs of piecewise polynomial functions can be written as the fixed points of local iterated function system we study the behavior of local iterated function systems using interpolation methods.

Keywords: fractal function, iterated function system, local iterated function system, attractor.

A New Family of Premium Principles Obtained by a Risk-Adjusted Distribution

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Risk-adjusted distributions are commonly used in actuarial science to define premium principles. In this work, que claim that an appropriate risk-adjusted distribution, besides of satisfying other desirable properties, should be well- behaved under conditioning with respect to the original risk distribution. Based on a sequence of such risk-adjusted distributions, we introduce a family of premium principles that gradually incorporate the degree of risk-aversion of the insurer in the safety loading. Member of this family are particular distortion premium principles that can be represented as mixtures of TVaRs, where the weights in the mixture reflect the attitude toward risk of the insurer. We make a systematic study of this family of premium principles.

Keywords: premium principle, risk measure, order statistics, distortion function.

Selecting Speech Spectrograms to Evaluate Sounds in Development

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In order to assess progress in developmental speech, it is necessary to evaluate the quality of vowel and consonant sounds in the production of words. This paper addresses the latter by proposing a novel method of selecting spectrograms from the large number that are available in speech data. An established method in the literature is to use the productions of each consonant in *all* the words in the data and by examining their spectrograms to decide to what proportion is the consonant produced accurately, that is, in an adult-like manner. The difficulty in achieving this lies in the fact that each word is produced more than once and is not produced in the same way every time, resulting in a large amount of computations. To overcome this, it is proposed here that a consonant is considered to be accurately produced in a specific word if it is accurately produced at least once. This way, the amount of computations is reduced since the remaining productions of this word are ignored, and the proportion of accurate productions of a consonant in a specific word is either one or zero. It is clear that when consonants are produced either always accurately or never accurately in a specific word, the two methods yield the same result. During speech development, however, children's productions of consonants vary. Therefore, the pertinent question is whether the proposed approximation of a consonant's accuracy is satisfactory as compared to the accuracy computed from the whole speech data, and how this comparison varies across all the consonants. This question is answered here by considering a child's English speech productions over one month during phonological development, at two and a half years old. The proposed approximate proportion of accuracy over all consonants has a mean of 0.46 and a variance of 0.12. If the exact proportion of accuracy is taken as equal to the approximate proportion of accuracy, the error involved results in a coefficient of determination equal to 0.87. If the exact proportion is obtained from the approximate proportion by raising it to the power of 1.67, the coefficient of determination is improved becoming 0.97. The results obtained here should encourage similar calculations for other children at different stages in their speech development with the aim of obtaining a universal formula for computing consonant accuracy using only a sample of speech spectrograms from the complete set in a speech data.

The Epistemic Uncertainty Analysis for the Inventory Management System with (Q,r) Policy

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In this paper, we consider the inventory systems, under propagation of epistemic uncertainty in some model parameters. The applying of Taylor series expansion method for Markov chains, we compute performance measures for a class of inventory systems, under the epistemic uncertainty inflicted in the model parameters. Specially, we calculate the expected value and the variance of the stationary distribution associated with the considered model. Various numerical results are presented and compared to the analogously Monte Carlo simulations ones.

Keywords: Inventory; Parametric uncertainty; Taylor series expansions; Monte Carlo Simulation.

At-Risk-of-Poverty or Social Exclusion Rate – Regional Aspects in the Slovak and Czech Republic and International Comparison

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More than 120 million people are at risk of poverty or social exclusion in the EU. EU leaders have pledged to bring at least 20 million people out of poverty and social exclusion by 2020. The fight against poverty and social exclusion is at the heart of the Europe 2020 strategy for smart, sustainable and inclusive growth. Each individual member state will have to adopt one or several national targets.
Presented article examines the aggregate indicator of poverty and social exclusion AROPE in the Slovak and Czech Republic. Indicator AROPE is the sum of persons who are at-risk-of-poverty or severely materially deprived or living in households with very low work intensity as a share of the total population. Source for calculating of this indicator is harmonized EU SILC statistical survey. We focus on distribution of poverty and social exclusion in the regions of Slovakia and Czech Republic. We describe current trends for aggregate indicator in Slovakia and Czech Republic and compare our values and trends with others EU countries. The paper uses selected statistical and mathematical models and procedures.

Keywords: Europe 2020 Strategy, At-Risk-of-Poverty, Material Deprivation, Low Work Intensity, Region, EU SILC database.

Estimating Heterogeneous Time-Varying Parameters in Brand Choice Models

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Nowadays, modeling brand choice using the multinomial logit model is standard in quantitative marketing. In most applications estimated coefficients representing brand preferences and/or the sensitivity of consumers regarding price and promotional activities are assumed to be constant over time. Marketing theories as well as the experience of marketing practitioners however suggest the existence of trends and/or short-term variations in particular parameters. Hence, having constant parameters over time is a highly restrictive assumption.

We therefore develop a flexible heterogeneous multinomial logit model to estimate time-varying parameters. Both time-varying brand intercepts and time-varying effects of covariates are modeled based on penalized splines, a flexible yet parsimonious nonparametric smoothing technique. The estimation procedure is fully data-driven, determining the flexible function estimates and the corresponding degree of smoothness in a unified approach. In addition, our approach allows for heterogeneity in all parameters.

To assess the performance of the new model, we compare it to models without time-varying parameters and/or without heterogeneity as well as to further benchmark models. Our findings suggest that models allowing for time-varying effects can significantly outperform models assuming constant parameters both in terms of fit and predictive validity.

Keywords: Brand Choice Modeling, Time-Varying Parameters, Heterogeneity, Semiparametric Regression, P(enalized) Splines.

The Feed Consumption and the Piglets' Growth during the Rearing Period Observed in 2015 VS Expected in 2005

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In the Dr. Manfred Weber's research report published as the professional information by Landesanstalt für Landeswirtschaft und Gartenbau in Bernburg, Sachsen-Anhalt, B.R. of Germany, in November 2015 it has been written that hybrid piglets during the rearing period (from the age of 28 days till the age of 49 days) consumed on an average 393 g of the feed mixture (18 days the starter mixture containing 14.2 MJ of the energy and 17.4% of the crude proteins per kilogramme, 3 days the grower mixture having 14.2 MJ of the energy and 18.4% of the crude proteins per kilogramme) and they gained 282 g a day. The weaners averaged 8.3 kg at the age of 28 days and achieved 9.0 kg at the age of 35 days, 11.0 kg at the age of 42 days and 14.3 kg at the age of 49 days. With those mean values the minimum of the feed mixture required for the maintenance (KG_{FM}) of the piglets' live weight (KG_{LW}) was calculated using the equation $KG_{FM} = KG_{LW}^{5/9} \times 0.0713598$. It was found out that 248 g of consumed feed mixture had been required for the maintenance of the piglets' live weight a day. From 393 g of consumed feed mixture 145 g per day could be used for the production of the piglets' gain. At the International Conference "Modern Genetics, the Nutrition and the Management in the Pig Industry of Serbia" in September 2005 it was shown that 215 g/day of the feed mixture were required for the production of 372 g/day of the gain of piglets, contemporarily bred and held under favourable circumstances, during the period from the age of 28 days till the age of 49 days. In 2015 it was observed that piglets could use 0.6744 of the quantity of the feed mixture required for the production of the gain of live weight. It was possible to conclude that those piglets were able to gain 0.6744 of 372 g, i.e. 251 g a day. The piglets' gain was lessened because the part of consumed feed mixture available for the production of live weight was diminished but observed gain of 282 g/day did 1.1235 of possible magnitude, doing 0.7581 of the gain expected from 2005. That deviation is explainable by the fact that piglets in 2015 consumed approximately 74% of the rate of crude proteins estimated to be suitable for contemporarily bred – hybrid piglets during the rearing period.

Keywords: Piglet, Rearing, Feed Consumption, Growth.

Merging and Diffusion Approximation of Stochastic Epidemic Models

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A particular challenge in epidemic modelling is the appropriate way to allow for spatial population structure, whereby the rate of contacts between hosts depends on their spatial separation or relative position in a social network. To capture the real complexity of such dynamics, we propose a model of the evolution of epidemic and awareness spreading processes on a different population partitions, mixing patterns and mobility structures. Based on random evolutions, we study merging and diffusion approximation of structured epidemic models.

Keywords: epidemics, merging, diffusion approximation.

Stochastic Modelling and Pricing of Energy Markets' Contracts with Local Stochastic Delayed and Jumped Volatilities

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In this talk we study stochastic modelling and pricing of electricity, gas and temperature markets' contracts with delay and jumps, modelled by independent increments processes. The spot price models are based on a sum of non-Gaussian Ornstein-Uhlenbeck processes (including geometric and arithmetic models), describing the long- and short-term fluctuations of the spot dynamics. The models include jumps not only in the spot dynamics but also in the stochastic volatility to describe typical features like spikes of energy spot prices and jumps in the volatility. The basic products in these markets are spot, futures and forward contracts, swaps and options written on these, which will be investigated in our talk.

Keywords: energy markets; stochastic, jump and delayed volatilities; pricing energy contracts; spot, forwards and futures.

Fuzzyfying Labour Market States

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In this paper the theory of fuzzy logic and fuzzy reasoning is combined with the theory of Markov systems and the concept of a non homogeneous Markov system with fuzzy states is proposed for the measurement of labour mobility. This is an effort to deal with the uncertainty introduced in the estimation of the transition probabilities, especially when social mobility is being measured, and the fact of fuzzy states, in the sense that the categories cannot be precisely measured and are therefore fuzzy. A description of the methodology is outlined and the basic parameters of the system are estimated. Moreover, the proposed methodology is illustrated through the example of measuring transitions between labour market states based on raw data drawn from the EU-LFS survey.

Keywords: Markov systems, Fuzzy Markov systems, Probability of fuzzy events, Fuzzy states, Social mobility**,** EU-LFS.

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A Neuro-Fuzzy Approach to Measuring Attitudes

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The present paper deals with the application of neuro-fuzzy techniques to the measurements of attitudes. The methodology used is analyses and it is illustrated and evaluated on data drawn from a large-scale survey conducted by the National Centre of Social Research of Greece, in order to investigate opinions, attitudes and stereotypes towards the "other" foreigner. The illustration provides a meaningful way of classifying respondents into xenophobic levels, taking also into account other important socio-demographic characteristics, such as age and gender. The methodology moreover provides a way of determining answers provided by respondents that are questionable.

Keywords: Likert scales, attitude measurement, neuro-fuzzy systems.

Labour Market flows in Europe: Evidence from the EU-LFS

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It has been revealed that transition patterns differ considerably across Europe, showing a continuous decrease in the probabilities of remaining into full-time employment and an increase in the unemployment rates or unstable employment. This trend is more common for young people, as they are in a more disadvantaged position, facing much more turnover between employment, unemployment and inactivity compared to the older workers. The present paper presents an analysis on the labour market dynamics in Europe. Raw data drawn from the European Union Labour Force Survey (EU-LFS) are used to show similarities and differences in the labour market flows across European countries for the years 2014 and 2015. Methodologically, we use the theory of non-homogeneous Markov system. More particularly, the population is stratified according to the labour market status and transition probability matrices are generated by educational level and gender, where possible to show movements between the labour market states of employment, unemployment and inactivity and vice versa. Indices are calculated for two age cohorts, in order to compare labour market patterns between young and older people.

Keywords: Labour market flows, Markov systems, transition probabilities, EU-LFS, Europe.

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On the Measurement of Early Job Insecurity in Europe

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In the present paper the estimation of different indicators that can be used in order to capture the extent and forms of early job insecurity is studied. This specific matter has been receiving increasing research and policy attention throughout the two last decades. The present study proposes a new index for measuring the degree of early job insecurity on

the basis of the estimation of the transition probabilities between labour market states and school-to-work transitions, with raw data drawn from the latest available EU's Labour Force Survey (EU- LFS), i.e. for the year 2014 and 2015. This indicator reflects a more meaningful way of estimating labour mobility or fluidity for young individuals aged between 15 and 29 adjusting the well-established mobility indices to the labour market area. Thus, an attempt is made basically to provide a new measure for early job insecurity, connecting it also to school-to-work transition probabilities, that captures the extent of early job insecurity.

Keywords: Labour market flows, Markov systems, transition probabilities, EU-LFS, Europe.

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FISS- The Factor Based Index of Systemic Stress

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Tracking and monitoring stress within the financial system is a key component for financial stabil-ity and macroprudential policy purposes. Financial stress measures are important as forward looking indicators to signal potential vulnerabilities in the market, enabling policy makers to take corrective measures in time, minimizing the impact on the real economy. This paper introduces a new measure of the contemporaneous stress within the Hungarian financial system named Fac-tor based Index of Systemic Stress (FISS). The aim was to capture the common components of financial stress that optimally compress the information available in high-dimensional data. Its statistical design is a dynamic Bayesian factor method. The main methodological innovation of the FISS is the ability to fully capture information contained in persistent high-frequency data, namely the usage of common stochastic trends as factors. We determine the optimal linear com-bination of factors resulting in the final index with Information Value methodology. Applied to Hungarian data the FISS is planned to be a key element of the macroprudential toolkit.

Keywords: financial system, financial stability, systemic risk, financial stress index, macro-financial linkages.

Random Effects Models in Item Analysis: Exploring Applications in Autobiographical Memory

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Random effects models have found application in several areas of behavioral studies, when data are clustered. In particular, in the case of more observations for each person, repeated measures are clustered within subjects. Two situations occur. In the first one, the same measurement is repeated in time, leading to grow curves modeling. In the second one, a certain set of stimuli and/or items are submitted top to respondents, therefore the model applies to the set of items/stimuli within the same person. The heterogeneity within and between respondents are typical sources of variation in response data that needs to be accounted for in an appropriate statistical response model. The typical approach to study items in a scale or a test is Item Response Theory (IRT): the analysis produces a score and a standard error for each case. On the other hand, item responses data can be recognized as a clustered or nested structure. Namely, an item response model is a non linear mixed effects model. Observations from each respondent are mutually dependent, as they share a common underlying trait, for instance ability. First level (L1) units are responses to items, subjects represent level 2 (L2) units. In the case of the two parameter model and of a dichotomous response:

$$h\left(E\left(y_{ik}\backslash\beta_i - \delta_j\right)\right) = \alpha_j\beta_i - \delta_j \qquad (1)$$

where $h(.)$ is the logit link function, i indexes subjects, $i = 1, 2, .., n, j,$ indexes items and $j = 1, 2, .., K.$ Both item and person parameters are random. Expression (1) is a non linear mixed effects model and the correlations of the L1 item responses are described by the random person parameters. Mixed random effects models are flexible, since they provide, in addition to item and person parameters, test for differential item functioning (DIF). The applicative advantages of this methodological frame are explored with respect to a specific behavioral topic, autobiographical memory, within an ongoing research were data are being collected in line with a coherent and sound behavioural theoretical approach. The application extends the model in (1), with a dichotomous response, to the case of a politomous response, in the so-called Partial Credit (PC) model.

Keywords: item, random effect, nested, latent.

Experiment with a Survey-Based Election to the Student Parliament of the Karlsruhe Institute of Technology

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Since voters are often swayed more by the personal image of politicians than by party manifestos, they may cast votes that are in opposition to their policy preferences. This results in the election of representatives who do not correspond exactly to the voters' own views. An alternative voting procedure to avoid this type of election failure is proposed in some previous publications by the author. It is based on the approach implemented in internet voting advice applications, like the German Wahl-O-Mat, which asks the user a number of questions on topical policy issues; the computer program, drawing on all the parties' answers, finds for the user the best-matching party, the second-best-matching party, etc. Under the proposed alternative election method, the voters cast no direct votes. Rather, they are asked about their preferences on the policy issues as declared in the party manifestos (Introduce nationwide minimum wage? Yes/No; Introduce a speed limit on the motorways? Yes/No, etc.), which reveals the balance of public opinion on each issue. These embedded referenda measure the degree to which the parties' policies match the preferences of the electorate. The parliament seats are then distributed among the parties in proportion to their indices of popularity (the average percentage of the population represented on all the issues) and universality (frequency in representing a majority). This paper reports on an experimental application of this method during the election of the Karlsruhe Institute of Technology Student Parliament on July 4–8, 2016. The experiment shows that the alternative election method can increase the representativeness of the Student Parliament. We also discuss some traits and bottlenecks of the method that should be taken into account when preparing elections.

Keywords: Election, voting, parliament, policy representation, representative democracy.

On the Kernel Hazard Rate Estimation under Association and Truncation

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Survival analysis is the part of statistics, in which the variable of interest (lifetime) may often be interpreted as the time elapsed between two

events and then, one may not be able to observe completely the variable under study. Such variables typically appear in a medical or an engineering life test studies. Among the different forms in which incomplete data appear, random left truncation is a common one.
The main results stated in the present work deal with the asymptotic analysis of a kernel estimator for the hazard rate function under left truncated and associated model. For this, we first establish strong uniform consistency rates and then, we provide simulation results to evaluate the finite-sample performances of the proposed estimator.

Keywords: Associated data, Hazard rate function, Lynden-Bell estimator, Random left truncation, Strong uniform consistency rate.

The Infinite Horizon Ruin Probability in the Cramer-Lundberg Model with Two-Sided Jumps

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Given the Cramer-Lundberg model with double sided jumps that are expressed by two stochastically independent compound Poisson processes, we study the behavior of the related ruin probability function (see also Vidmar (2016), and Pertsinidou (2017)). We derive an integral equation concerning the ruin function using analytic methods, only. Furthermore, we provide a procedure to find the ruin function when the jumps of the model follow some special, continuous distributions, under certain conditions and we ask whether these conditions can be practically relaxed.

Estimation of Two Sided Asset Return Jumps via Constraint Kalman Filtering

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The positive and negative jumps underlying the daily log returns of the Nasdaq index are estimated via constraint Kalman filtering. These jumps are determined by the arrival of positive and negative news in the market and are hidden (i.e., not observable). In order for the jumps to be non-negative, their probability density functions are appropriately truncated according to the non-negativity constraints and then the associated prior and posterior state estimates are derived. Finally, the fitting of this model to the empirical data is examined.

Frost Prediction in Apple Orchards Based upon Time Series Models

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The scope of this work was to calculate a frost forecast model for South Tyrol in Italy using weather data of the past 20 years which were recorded by 150 weather stations located in this region. Accurate frost forecasting should provide growers with the opportunity to prepare for frost events in order to avoid frost damage. The radiation frost in South Tyrol occurs during the so-called frost period, i.e. in the months of March, April and May during calm nights between sunset and sunrise. In case of a frost event, the farmers should immediately switch on water sprinklers. The ice cover which is built on the trees protects the buds or blossoms from damage. Based on the analysis of time series data, the proposed linear regression and ARIMA models could be compared and evaluated. The best result provided the ARIMA model, achieving in case of forecast of 95% confidence intervals the desired value of 1.0 for the recall. This means that all frost cases could be correctly predicted. Despite the encouraging results, the rate of the false positives is high, which needs further investigations (e.g., testing VARIMA models, which are a multivariate extension of ARIMA models). The graphical illustration of the 95% confidence intervals of the ARIMA model forecast should be very helpful in frost prediction and could be integrated in the electronic monitoring system that permits intelligent forecasting of frost weather phenomena.

Keywords: Frost Forecast, ARIMA Models, Time Series Prediction Models.

Familys' Transfers to the Divorced Elderly

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Within the aging of population the question of care and financial support of elderly become increasingly relevant. Meanwhile the spread of divorce and separation becomes a very strong trend in the modern society. Divorced elderly cannot get support from their partner, they do not work anymore and thus their income consists only of pensions which are often not enough to provide the adequate standard of living. Transfers were significantly described in scientific literature (P. Samuelson, R. Baker),

but not from point of view of marital status. In this research, based on data from the «Comprehensive monitoring of living conditions of the population» conducted in Russia in 2014, author examines how children in Russia help their old parents and how this help varies depending on gender and marital status.

The main factor here is the fact that life expectancy of men about 11 years less than of women. Due to this fact the rate of lonely women above 55 years old is much higher than the percentage of lonely men. Also men tend to remarriage easier than women, that's why they more often find a new family. It is a common practice in Russia that after divorce or separation children stay with mother and this make the remarriage for women more difficult. On the other hand this tight connection with children provides women more support than men.

For example through all marital statuses the biggest gender differences in material transfers are observed among divorced and separated people: the percent of men who get material support from their children is much lower than the percent of women (19,5% against 35,9% among divorced and 10% against 37,9% among separated). On the other hand the average income of men during working period of life is higher than income of women, due to this fact they more often have savings.

Another question is intangible help – housekeeping and care during illness – which can not be earned or saved and depends only on the relationship with children. From this point of view divorced and separated elderly men is the most vulnerable group: only one third of them get help from children.

At last when we analyze elderly who do not get help from their children because of the termination of the relationship, we see that "separated group" is presented only by men and 80% the "divorced group" is presented by men only.

To sum up the results Russia there is a big gap between elderly man and women in getting help from their children. Tight connection between children and mother after divorce or separation leads to more intensive transfers from this children when the woman gets retirement. Men make more savings than women which can help them to overcome the lack of the material support from their children, but they can not help to overcome the lack of intangible help. This problem can be solved with the development of institutions with which men can get such services, but unfortunately this sphere is still not high-developed in Russia.

Keywords: transfers, houshold, family, divorce.

A Local Approach based on Risk Measures for the Hedging of Variable Annuities

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We present a simple local hedging approach based on risk measures for the hedging of variable annuities in the presence of equity risk, interest rate risk and basis risk. The hedging strategy is obtained by minimizing risk with respect to next-period's cash flow injection within the hedging portfolio by the insurer. Taylor expansion based approximations are used to improve the tractability of the approach by reducing the problem's dimensionality. The impact of basis risk on capital requirements in quantified. The hedging performance of our approach is compared to industry benchmarks such as Fund Mapping Regressions.

Keywords: Hedging, Variable Annuities, Risk Measures, Basis Risk.

Nano-Sols Shelf-Life Prediction via Accelerated Degradation Model

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In order to provide timely product's lifetime information to the customers, conventionally, manufacturers usually use temperature (or voltage) as an accelerating variable for shortening life testing time. Based on well-known life-stress relationship (such as Arrhenius reaction or inverse power model), it allows us to extrapolate the lifetime of highly-reliable products at a normal used condition. In this talk, however, we will present a real case study that the shelf-life prediction of nano-sol products can be successfully obtained by adopting pH value as an accelerating variable. An accelerated profile-degradation model is proposed to describe the time-evolution of the particle size distributions under three different pH values. Then, we can analytically construct the confidence interval for the shelf-life of nano-sol products under its normal use condition.

Keywords: nano-sol, accelerated profile-degradation model, shelf-life prediction.

Adaptive MCMC for Multivariate Stable Distributions

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Markov chain Monte Carlo adaptive methods by creating computationally effective algorithms for decision-making of data analysis with the given accuracy are analyzed in this paper. The task for estimation of parameters of the multivariate stable symmetric vector law which is constructed in hierarchical way is described and solved in this paper. To create the adaptive MCMC procedure, the sequential generating method is applied for Monte Carlo samples, introducing rules for statistical termination and for sample size regulation of Markov chains. Statistical task, solved by this method, reveal characteristics of relevant computational problems including MCMC method.
Effectiveness of the MCMC algorithms is analyzed by statistical modeling method, constructed in the paper. Tests made with financial data of enterprises, confirmed that numerical properties of the method correspond to the theoretical model. Tests of algorithms have shown that adaptive MCMC algorithm allows obtaining estimators of examined distribution parameters in lower number of chains, and reducing the volume of calculations approximately two times. The algorithms created in this paper can be used to test the systems of stochastic type and to solve other statistical tasks by MCMC method.

Keywords: Monte Carlo method, EM algorithm, maximum likelihood method, stable distributions, stochastic optimization.

Bibliometric Variables Determining the Quality of a Dentistry Journal

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On the basis of a review of the main journals in the field of Dentistry Science indexed in Journal of Citation Report (JCR) a set of variables, both quantitave such as number of papers per issue, frequency, H-index of authors or number of keywords, and categorical ones such as open access, electronic submission, suitability to CONSORT guide (only for clinical trials) or tables and figures presentation, with potential influence in the quality of those journals, measured by means of the impact factor and the eigenfactor, has been selected. Afterwards, by sampling more than 40 journals in this field, the most significant ones have been chosen

by means of an ordinal regression model. All the calculations have been implemented by R programm.

Keywords: Impact factor, Eigenfactor, Ordinal regression, Dentistry journal.

Are the Leverage Point the most Terrible Problem in Regression?

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When studying property of recently proposed S-weighted estimators (Víšek (2015), (2016)) it appeared that the most previously studied (highly) robust estimators can (and typically) have problems with the outliers when in data are also good leverage points. Of course, it depends on the topology of data – the outliers can't be very far from the bulk of data. The S-weighted estimators are generalization of the Least Weighted Squares estimators as well as of S-estimators. They look for the minimal value of estimator of the standard deviation of disturbances but they also employ weights to depress the influential points which can have improper affect on the estimation of underlying regression model. Due to the fact that the weights are assigned to the observations by the method itself, S-weighted estimators can avoid the problems which the other methods (can) suffer. This malfunction of some estimators is a consequence of the fact that they look (implicitly or explicitly) for the minimal value of estimator of the standard deviation of disturbances in a way which is too much focused on this minimization, not allowing to recognize the information that the good leverage points bring. S-weighted estimators - contrary to S-estimators, W-estimators or M-estimators were able properly find the outliers and utilize also the information offered by the good leverage points. Due to the fact that S-weighted estimators were able to employ efficiently the information contained in the leverage points, their empirical mean square errors (in simulations) were (much) smaller than the mean square errors of other estimators.

Keywords: Robust estimation of regression model, S-estimators, the Least Weighted Squares, S-weighted estimators.

References:

[1]. Víšek, J. Á. (2015): S-weighted estimators. *Proc. of the 16th Conference on the Applied Stochastic Models, Data Analysis and Demographics 2015, ed. Christos H. Skiadas, 1031–1042.*

[2]. Víšek, J. Á. (2016): Representation of SW-estimators. *Proc. 4th Stochastic Modeling Techniques and Data Analysis International Conference with Demographics Workshop, SMTDA 2016, ed. Christos H. Skiadas, 425–438.*

A Generalized Distribution Family of the Freund Bivariate Exponential Model

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Recently, an extension of the Freund's bivariate exponential (FBE) load share distribution has been provided by Asha, Krishnan and Kundu (2016) and called the extended Freund's bivariate (EFB) distribution. The Freund (1961) model is based on the lifetime distributions of the two-component parallel redundant systems whose components have exponential distributions, and it was extended through Weibull components by Lu (1989). In the recent EFB model, Asha et al. (2016) have considered components having proportional failure rate models with an underlying distribution.
In this work, a generalization of the EFB (GFB) distribution is derived taking into account how failure rates change after failing a component. Specifically, when a component fails, the baseline distribution function of the remaining working component could also change, since the instantaneous failure probability (failure rate) is expected to be modified due to overload of the surviving component.

Keywords: Freund exponential model, bivariate distribution, failure rate, parallel system.

References:

[1]. Asha, G., Krishnan, J.K.M. and Kundu, D. (2016). An extension of the Freund's bivariate distribution to model load sharing systems. American Journal of Mathematical and Management Sciences.
[2]. Freund, J.E. (1961). A bivariate extension of the exponential distribution. Journal of the American Statistical Association, 56, 971-977.
[3]. Lu, J.C. (1989). Weibull extensions of the Freund and Marshall-Olkin bivariate exponential models. IEEE Transactions on Reliability, 38, 615–620.

Grouping Property and Relative Importance of predictors in Linear Regression

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The quantification of the importance of predictors on a response variable has been a subject of research in several fields such as biostatistics, psychology, economics or market research. Regression analysis may be used for that purpose but estimating importance of predictors via (standardized) regression coefficients is often not adequate because of

the presence of correlations between these variables. Therefore, alternative methods have been considered.
Grouping property is said to be respected when estimators of importance tend to equate for highly correlated predictors. While standardized regression coefficients for instance do not respect grouping property, we will analyze the respect of grouping property for some methods used to quantify relative importance through decomposition of the explained variance such as Fabbris, Shapley Value, Genizi-Johnson and CAR scores (Correlation-Adjusted Correlation). These analyses will be based on theoretical demonstration and illustrated with datasets.
CAR scores have been recommended as estimators of importance of predictors in the field of biostatistics and been justified by the respect of grouping property. Quite contrary we will show theoretically and on examples that CAR scores do not respect this property. We will explain in return why some other variance decomposition methods do respect grouping property. We will also discuss quantification of importance using random forests in the perspective of grouping property.
Lastly, we will formulate recommendations for estimation of the relative importance of predictors.

Keywords: Variance decomposition, multiple regression, CAR scores, random forests.

On GARCH Models with Temporary Structural Changes

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When an economic shock like the Lehman Crisis occurred, it is expected to investigate its influence based on economic time series. The intervention analysis by Box and Tiao is a method for such a purpose. Most of the intervention analyses are based on ARIMA models, but some are on GARCH models. The GARCH models have been developed for analyzing time series of stock returns. Usually the expected value function of a GARCH model is assumed to be constant. However, this assumption is not appropriate when a time series includes a varying trend. Our first purpose is to propose a trend model, which can be easily taken in intervention analysis.
Furthermore we generalize this model for an intervention analysis on both of trend and volatility in a GARCH model. An identification method is also provided and is evaluated by simulation studies. Usability of the proposed model is demonstrated by applying to real stock returns.

Keywords: Intervention analysis, stock return, trend.

Operator Models in Theory of Branching Random Walks and their Applications

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Stochastic processes with generation and transport of particles are used in different areas of nature sciences: statistical physics, chemical kinetics, population dynamics etc. Nowadays it is commonly accepted to describe such processes in terms of branching random walks. Branching random walk is a stochastic process which combines the properties of a branching process and a random walk. Behavior of branching random walks in many ways is determined by properties of a particle motion and a dimension of the space in which the particles evolve. We consider continuous-time branching random walks on multidimensional lattices with a finite set of the particle generation centers, i.e. branching sources. The description of a random walk in terms of Green's function allows us to offer a general approach to investigation of random walks with finite as well as with infinite variance of jump. The main object of study is the evolutionary operator for the mean number of particles both at an arbitrary point and on the entire lattice. The existence of positive eigenvalues in the spectrum of an evolutionary operator results in the exponential growth of the number of particles in branching random walks, called supercritical in such a case. For supercritical branching random walks, it is shown that the amount of positive eigenvalues of the evolutionary operator, counting their multiplicity, does not exceed the amount of branching sources on the lattice with positive intensity, while the maximum of these eigenvalues is always simple. We demonstrate that the appearance of multiple lower eigenvalues in the spectrum of the evolutionary operator can be caused by a kind of `symmetry' in the spatial configuration of branching sources.

Keywords: Operator Models, Spectral Analysis, Branching Random Walks, Limit Theorems, Population Dynamics.

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Investigating Southern Europeans' Perceptions of Their Employment Status

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The European Union Labour Force Survey (EU-LFS) measurement of the employment status is based on a synthesized economic construct computed according to the ILO conventional definitions of employed, unemployed and inactive. Since the late 2000s, a variable measuring people's perceptions of their employment status has been included in the EU-LFS questionnaire as it is used in all large-scale sample surveys, i.e. one of the occupational background variables. These measurements are not comparable and their results will differ since a composite economic construct would normally deviate from people's perceptions. The purpose of this paper is, by obtaining a social "profile" of agreement and disagreement between Southern Europeans' self-declared perceptions of their employment status and the ILO conventional definitions, to investigate whether or not conflicting and coinciding perceptions differ overtime within-nations and cross-nationally. The analysis is based on the 2008-2014 annual datasets for Greece, Italy, Portugal and Spain. The results are reported for the age group 15-74 so as to allow for comparability with the ILO conventional definition of unemployment.

Keywords: Employment status, ILO, EU-LFS, Southern Europe.

Estimation the Key Value of Shift Cipher by Neural Networks – A Case Study

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Security is an extensive concern in information and data systems. One of the most important ways for keeping information secure is cryptology which provides various algorithms to perform substitutions and transformation on the original text to produce unintelligible ciphertext. There are many algorithms in cryptology field. The public and private key pair comprise of two uniquely related cryptographic keys. In private key cryptography, the key is secret and it uses the same cryptographic keys for both encryption and decryption processes. In public key cryptography, encryption and decryption parts use different keys and one

of them is private while the other is public. Any person can encrypt a message using the public key of the receiver, but such a message can be decrypted only with the receiver's private key. When a cipher method is applied to a plaintext, first of all the letters must be transformed to numbers as:

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

Shift Cipher is one of the methods in private key cryptography and involves the shifted letters of all the letters in plaintext by a specific step number which is the key of the algorithm and constitutes ciphertext. Some samples of plaintext and ciphertext in terms of English alphabet can be seen in the table below.

Key = 0

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Key =3 (Caesar Cipher)

D E F G H I J K L M N O P Q R S T U V W X Y Z A B C

Key = 10

K L M N O P Q R S T U V W X Y Z A B C D E F G H I J

Neural networks is a modelling and estimating method which is used in many fields. In this study, we use neural networks to find the private key and cryptanalysis of Shift Cipher methodology in a specific case study. The results show that neural networks is an appropriate method for Shift Cipher cryptanalysis and in future work we will observe if the cryptanalysis of other cryptosystems can be done by neural networks or not.

Keywords: Neural Networks, Private Key Cryptography, Shift Cipher.

Dealing with Inaccuracies and Limitations of Empirical Mortality Data in Small Populations

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This paper provides a description of the most typical problems and limitations affecting mortality data of small populations, discusses their consequences in estimating age-specific mortality patterns, and also proposes methodology for overcoming them. In this context a theoretically consistent though computationally simple technique for minimizing random variations in age-specific death counts is proposed and demonstrated.

Health Estimates for some Countries of the Rapid Developing World

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The recent developments of health were studied in the emerging economies of Brazil, Russia, India, Indonesia and China. Data come from the World Health Organization in the form of abridged life tables. These tables were unabridged into full ones with the UNABR application of the MORTPAK (4.3) software which has been created by the United Nations Population Division for the needs of mortality analysis. The extended life tables were used subsequently in order for the First Exit Time theory to be applied and a healthy life expectancy to be estimated. Firstly, results indicate a general trend of improvement in these countries. Secondly, they are in accordance with the findings of WHO and its related teams concerning healthy life expectancy, which has been estimated on the basis of a totally different methodology; thus First Exit Time theory application constitutes a rather parsimonious and efficient technique for the estimation of relevant measures.

Limit Theorems for Compound Renewal Processes: Theory and Applications

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We consider a few classes of strong limit theorems for compound renewal processes (random sums, randomly stopped sums) D(t) = $S(N(t)) = \sum_{i=1}^{N(t)} x_i$ under various assumptions on the renewal counting process N(t) and random variables $\{x_i,\ i \geq 1\}$, which summarize authors previous results obtained during last five years or so. First of all we present sufficient conditions for strong (a.s.) approximation of D(t) by a Wiener or α-stable Lévy process under various dependent and moment conditions on summands, mainly focused on the cases of independent, weakly dependent, φ-mixing and associated r.v. On the next step a number of integral tests for investigation the rate of growth of the process D(t) and it's increments D(t+a(t)) - D(t), when a(t) grows as t→∞, are proposed. As a consequence various modifications of the LIL and Erdös-Rényi-Csörgő-Révész-type SLLN are obtained. Useful

applications in financial mathematics, queuing and risk theories are investigated; particularly, non-random bounds for the rate of growth and fluctuations of the risk processes in classical Cramer-Lundberg and renewal Sparre Andersen risk models are discussed as well as the case of risk models with stochastic premiums.

Keywords: Compound Renewal Process, Random Sum, Limit Theorem, Strong Approximation, Integral Tests, Queuing Theory, Risk Process.

The Score Correlation Coefficient

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The usual measure of linear dependence of random variables X and Y is the correlation coefficient. Its currently used estimates are independent of marginal distributions of both X and Y. Usually, it is supposed that:
i) if X and Y have light-tailed distributions, the best estimate is the Pearson correlation coefficient
ii) if some of them has contaminated light-tailed distribution, the best estimate is some version of robust correlation coefficients
iii) if some of them has heavy-tailed distribution, the best estimate is a rank correlation coefficient.
Recently, Fabián (2001) generalized the concept of the scalar score fuction of distributions having support the entire R and location parameter for any continuous distribution F(x; ɵ) with arbitrary support and arbitrary vector ɵ of parameters. This function, T(x; ɵ), say, is considered to be the likelihood (Fisher) score with respect to the (newly introduced) 'center' of distribution F. T(x; ɵ) of some currently used models is identical with the actual likelihood with respect to a ('central') component of ɵ.
Using this 'relative influence of observations‘ function makes possible to study distribution-dependent score correlation coefficients and to verify assumptions i)-iii).
These assumptions were partly confirmed by our simulation experiments. The score correlation coefficient seems to be the best estimate of linear dependence of X and Y only if they have skewed, 'medium‘ heavy-tailed distributions with Pareto-type tail and a reasonably small value of the generalized coefficient of variation. Moreover, we found that if the data stem from heavy-tailed distributions, all the estimates of the correlation coefficient depend to the certain extent on the estimated value.

Keywords: score function, heavy tails.

Reference: Fabián Z. (2001). Induced cores and their use in robust parametric estimation. Comm. Statist. Theory -Methods, 30, 537-556.

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