**UNIVERSITATEA BUCUREŞTI**
**Facultatea de Matematică şi Informatică**

**ACADEMIA DE STUDII ECONOMICE**
**Facultatea de Cibernetică, Statistică şi Informatică Economică**

**ACADEMIA ROMÂNĂ**
**Institutul de Statistică Matematică şi Matematică Aplicată „Gheorghe Mihoc – Caius Iacob”**

# A 16-a CONFERINŢĂ A SOCIETĂŢII DE PROBABILITĂŢI ŞI STATISTICĂ DIN ROMÂNIA

**Academia de Studii Economice Bucureşti**
**Departamentul de Matematici Aplicate**
**26 aprilie 2013**

SPONSOR PRINCIPAL: **CENTRUL DE CERCETĂRI MATEMATICE AVANSATE FUNDAMENTALE ŞI APLICATIVE ASE BUCUREŞTI**

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## PROGRAMUL CONFERINŢEI SPSR 2013

**Secţiuni:**

1. **Probabilităţi şi Procese Stocastice**
2. **Statistică**
3. **Optimizări, Matematici Financiare şi Actuariat**

**Vineri 26 aprilie 2013**

**9:00 – 9:45** ***Adunare generală a SPSR*** **(sala Schumann)**
**Ordinea de zi: raport financiar, diverse**

**9:45 – 10:00 Pauză**

***Conferinţe invitate*** **(sala Schumann)**
**Conduce: Acad. Ioan Cuculescu**

**10:00 – 10:30** Valentin Paţilea (ENSAI)

***Parametric inference in conditional moment equations models***

**10:30 – 11:00** Gheorghiţă Zbăganu (Universitatea Bucureşti)

***Lorenz Curve and mysteries of order statistics***

**11:00 – 11:30 Pauză de cafea (sala 2624)**

**11:30 – 13:00 Comunicări pe secţiuni (salile 2416, 2623, 2710)**

**13:00 – 15:00 Masa la cantina-restaurant Cihoschi**

**15:00 – 16:30 Comunicări pe secţiuni (sălile 2416, 2623, 2710)**

**16:30 – 16:45 Pauză de cafea (sala 2624)**

**16:45 – 18:45 Comunicări pe secţiuni (sălile 2416, 2623, 2710)**

**19:00 Cină festivă (Casa Universitarilor)**

# COMUNICĂRI PE SECŢIUNI

## Secţiunea Probabilităţi şi Procese Stocastice (Sala 2416)

**Conduce: Acad. Ioan Cuculescu**

11:30 – 11:45

Romeo Negrea (Universitatea Politehnică din Timişoara)

***A fixed point technique in the frame of backward stochastic differential equations***

11:45 – 12:00

Alexei Leahu, Bogdan Gheorghe Munteanu (“Ovidius” University of Constanţa; “Henri Coandă” Air Forces Academy, Braşov)

***On the convolutions of power series type***

12:00 – 12:15

Aurelia Florea, Eugen Păltănea (Universitatea din Craiova, Universitatea „Transilvania” din Braşov )

***Some properties of convex order***

12:15 – 12:30

Vlad Ştefan Barbu (Université de Rouen)

***Hidden semi-Markov Models***

12:30 – 12:45

Corina Grosu (Universitatea Politehnica Bucureşti)

***On some problems connected to fractional calculus***

12:45 – 13:00

Bogdan Iftimie (ASE Bucureşti)

***O problemă de optimizare de portofolii într-o piaţă incompletă cu active cu salturi***

## Secţiunea Statistică (Sala 2623)

### Conduce: Valentin Paţilea

11:30 – 11:45

Ion Văduva (Universitatea Bucureşti)

***On some Mixed Distributions involved in Life Data Analysis***

11:45 – 12:00

Alexandru Amarioarei, Cristian Preda (University of Lille 1/ NIRDBS/ INRIA)

***Approximations for two-dimensional discrete scan statistics in some dependent models***

12:00 – 12:15

Ştefan Ştefănescu (University of Bucharest)

***Methods for classifying the economic and social indicators***

12:15 – 12:30

Voicu Boşcaiu ("Gheorghe Mihoc - Caius Iacob" Institute of Mathematical Statistics and Applied Mathematics)

***On mean estimation using information on auxiliary variable***

12:30 – 12:45

Aida Toma, Amor Keziou (ASE Bucureşti, ISMMA; Université de Reims Champagne-Ardenne)

***Robustness of dual divergence estimators for moment condition models***

12:45 – 13:00

Sorin Demetriu, Radu Văcăreanu, Florin Pavel (Universitatea Tehnică de Construcţii Bucureşti)

***Prediction models for earthquake ground motion parameters***

## Secţiunea Optimizări, Matematici Financiare şi Actuariat (Sala 2710)

**Conduce: Raluca Vernic**

11:30 – 11:45

Toni-Cătălin Mihalcea (Universitatea Bucureşti)

***Second-order optimality conditions for multiobjective optimization problems with fuzzy-valued objective functions***

11:45 – 12:00

Andreea Mădălina Stancu, I.M. Stancu-Minasian (ISMMA)

***Semilocally type-I univex functions and multiobjective fractional programming***

12:00 – 12:15

Bogdan-Corneliu Biolan (Universitatea Bucureşti)

***An approach of Nash equilibrium in infinite dimension***

12:15 – 12:30

Vasile Preda, Cristian Niculescu, Toni-Cătălin Mihalcea (Universitatea Bucureşti)

***Second-order optimality conditions in multiobjective optimization***

12:30 – 12:45

Sorina Gramatovici (ASE Bucureşti)

***Optimality and duality for fractional continuous programming problems***

12:45 – 13:00

Vasile Preda, Costel Bălcău (Universitatea Bucureşti, Universitatea din Piteşti)

***Applications of weighted entropy optimization models in transportation planning***

## Secţiunea Probabilităţi şi Procese Stocastice (Sala 2416)

**Conduce: Alexei Leahu**

15:00 – 15:15

Alexandru Agapie (ASE Bucureşti, ISMMA)

***Convergence of evolutionary algorithms on the n-dimensional continuous space***

15:15 – 15:30

Dragoş-Pătru Covei (Constantin Brâncuşi University of Târgu Jiu)

***Boundedness and blow-up of solutions for a nonlinear elliptic system arising in stochastic processes***

15:30 – 15:45

Udrea Păun (Academia Română)

***Some properties of a waiting time random variable***

15:45 – 16:00

Mioara Buiculescu (Institutul de Statistică Matematică şi Matematici Aplicate al Academiei Române)

***On quasi-stationary distributions for continuous time general Markov processes***

16:00 – 16:15

Marinela Marinescu, Daniela Ijacu (ASE Bucureşti)

***A filtering problem for SDEs with jumps***

16:15 – 16:30

Mariana Sibiceanu (ASE Bucureşti, ISMMA Academia Româna)

***Sufficient conditions for the applicability of the rate function formula in the Large Deviation Principle for Markov processes***

## Secţiunea Statistică (sala 2623)

### Conduce: Ion Văduva

15:00 – 15:15

Daniel Ciuiu (Universitatea Tehnică de Construcţii Bucureşti; Institutul de Prognoză Economică)

***A Jackson Queueing Network Model using Poisson Measures. Application to a Bank Model***

15:15 – 15:30

Luiza Bădin, Cinzia Daraio, Leopold Simar (ASE Bucureşti, ISMMA; Universitatea Sapienza Roma; Universitatea Catolică Louvain)

***Nonparametric conditional efficiency analysis with an application in the banking sector***

15:30 – 15:45

Cornelia Enăchescu (Academia Româna)

***Ranking conference proceedings for evaluating scientific performance. A Machine Learning Approach***

15:45 – 16:00

Ciprian Popescu (ASE Bucureşti)

***About the orthogonal regression and some of its economic applications***

16:00 – 16:15

Vinicius Almendra and Denis Enăchescu (Universitatea Bucureşti)

***Using unsupervised ART2 networks to build stable rare event classifiers***

16:15 – 16:30

Emil Simion (Universitatea Politehnica din Bucureşti)

***Improvement of NIST statistical tests***

## Secţiunea Optimizări, Matematici Financiare şi Actuariat (Sala 2710)

**Conduce: Ioan Stancu-Minasian**

15:00 – 15:15

Monica Patriche (Universitatea din Bucureşti)

***Fixed point theorems and applications***

15:15 – 15:30

Ovidiu Vegheş, Cristian Neculăescu (ASE Bucureşti)

***Instrumente software pentru Programare Liniară***

15:30 – 15:45

Elena Robe-Voinea, Raluca Vernic (Universitatea Ovidius Constanţa)

***Fast Fourier Transforms for bivariate aggregate losses. A Matlab application***

15:45 – 16:00

Raluca Vernic (Universitatea Ovidius Constanţa)

***On the bivariate Sarmanov distribution with log-logistic marginals: an actuarial application***

16:00 – 16:15

Marius Rădulescu, Sorin Rădulescu, Constanţa Zoie Rădulescu (Institutul de Statistică Matematică şi Matematică Aplicată)

***The efficient frontiers of parametric optimization problems***

16:15 – 16:30

Cristinca Fulga (ASE Bucureşti; Institutul de Statistică Matematică şi Matematică Aplicată)

***Optimization and performance evaluation in the portfolio selection problem***

## Secţiunea Probabilităţi şi Procese Stocastice (Sala 2416)

### Conduce: Mioara Buiculescu

16:45 – 17:00
Ovidiu Solomon, Marius Giuclea, Ana Maria Mitu (Universitatea Româno-Americană, ASE Bucureşti, Institutul de Mecanica Solidelor)

***Stochastic linearization of systems with hysteretic characteristics***

17:00 – 17:15
Viorel Petrehuş, Romică Trandafir, Sorin Demetriu (Universitatea Tehnică de Construcţii Bucureşti)

***Reliability assessment for the multicomponent and multistate k-out-of-n: G systems***

17:15 – 17:30
Ana Maria Răducan (Institutul de Statistică Matematică şi Matematică Aplicată Gheorghe Mihoc - Caius Iacob)

***Recursive expressions for ruin probability in discret case***

17:30 – 17:45
Valentin Ionescu (Institutul de Statistică Matematică şi Matematică Aplicată al Academiei Române)

***Construcţii şi teoreme asimptotice într-o teorie generalizată a probabilităţilor libere cu valori operatori***

17:45 – 18:00
Georgiana Constanţa Popovici, George Andrei Pădureanu (Universitatea Bucureşti)
***O aplicaţie a unui test tip entropie maximă***

18:00 – 18:15
Carmen Gheorghe (National Institute of Economic Research, Romanian Academy)

***New parametric families of Leimkuhler Curves***

## Secţiunea Statistică (sala 2623)

### Conduce: Vlad Ştefan Barbu

16:45 – 17:00

Vasile Silviu Laurenţiu (ISMMA, FMI)

***Some aspects of clinical trials***

17:00 – 17:15

Alin Marian Rusu (Universitatea Bucureşti)

***On the Beta Moyal Generalization***

17:15 – 17:30

Iuliana Iatan, Marcel Worring (Universitatea Tehnică de Construcţii Bucureşti)

***Similarity based Fuzzy Kwan-Cai Neural Network for Multimedia Analysis***

17:30 – 17:45

Manuela Ghica (Universitatea Spiru Haret)

***On a regression model with generalized Weibull distributions type***

17:45-18:00

Georgiana Constanţa Popovici, George Andrei Pădureanu (Universitatea Bucureşti)

***Analiză statistică şi modele tip Customer Intelligence. Un model semiparametric pentru probabilitatea de succes a vânzărilor***

18:00 – 18:15

Mircea Drăgulin (Universitatea Bucureşti)

***Asupra unor clase de modele statistice de fiabilitate***

18:15 – 18:30

Maria Crina Diaconu (Universitatea Bucureşti)

***Metode statistice în teoria sondajelor***

## Secţiunea Optimizări, Matematici Financiare şi Actuariat (sala 2710)

**Conduce: Marius Rădulescu**

16:45 – 17:00

Iulian Mircea, Mihaela Covrig (ASE Bucureşti)

***A method for estimate of the risk reserve in insurance***

17:00 – 17:15

Stelian Stancu, Alexandra Maria Constantin (ASE Bucureşti)

***Probabilistic independence and conditioning in economic mathematical modelling***

17:15 – 17:30

Cristina Cânepă

***Numerical simulation of defaults in large banking systems***

17:30 – 17:45

Silvia Dedu (ASE Bucureşti)

***Optimization of some risk measures in reinsurance***

17:45-18:00

Florentin Şerban (ASE Bucureşti)

***Constucţia unui portofoliu reprezentativ pentru BVB cu ajutorul Analizei în Componente Principale***

18:00 – 18:15

Maria Tudor, Cristiana Tudor (ASE Bucureşti)

***On the forecasting performance of symmetric and asymmetric conditional volatility models: in-sample and out-of-sample analysis***

18:15 – 18:30

Cristiana Tudor (ASE Bucureşti)

***Long memory in stock returns volatility: empirical estimation on the Bucharest Stock Exchange***

# REZUMATE

1. Alexandru Agapie (ASE Bucureşti, ISSMA)

## Convergence of evolutionary algorithms on the *n*-dimensional continuous space

Evolutionary algorithms (EAs) are random optimization methods inspired by genetics and natural selection, resembling simulated annealing. Existing theoretical results on EA suffer from either excessive restrictiveness of the assumptions under which the analysis is performed, or by extreme generality of said assumptions, which usually leads to little practical usefulness. We develop a method that can be used to find a meaningful trade-off between the difficulty of the analysis and the algorithms' efficiency. Since the case of a discrete search space has been studied extensively, we build on probability theory rather than statistical physics, and develop a new stochastic model for the continuous n-dimensional case. Our model uses renewal processes to find global convergence conditions. A second goal of the paper is the analytical estimation of the computation time of EA with uniform mutation inside the sphere of volume 1, minimizing a quadratic function.

2. Vinicius Almendra, Denis Enăchescu (Universitatea din Bucureşti)

## Using unsupervised ART2 networks to build stable rare event classifiers

ART (Adaptive Resonance Theory) networks for unsupervised learning try to solve the stability-plasticity dillema: they aim to learn fast enough new patterns while preserving the already learned ones. This characteristic make them interesting for problems where new patterns emerge while old ones may reappear. One of these fields is fraud detection at online auction sites. In order to verify if this technique is indeed useful in a set with rare events, we did several experiments to test its properties with existing datasets.

3. Amarioarei Alexandru, Preda Cristian (University of Lille 1/ NIRDBS/ INRIA)

**Approximations for two-dimensional discrete scan statistics in some dependent models**

We consider the two-dimensional discrete scan statistic generated by block factors from i.i.d. sequences. We present the approximation for the distribution of the scan statistics along with the corresponding error bounds. A simulation study illustrates our methodology.

4. Vlad Ştefan Barbu (Université de Rouen)

**Hidden semi-Markov Models**

In this talk, we are interested in hidden models of semi-Markovian type, in some related estimation questions and in possible domains of applications. First, we will present a canonical system for which hidden Markov or semi-Markov processes are appropriate modeling tools. We also introduce the corresponding notations and definitions. Second, we are interested in the estimation of such a model. We present results on the consistency and asymptotic normality of maximum likelihood estimators obtained for the characteristics of such a model (semi-Markov kernel, sojourn time distribution, etc.). From a practical point of view, the estimators can be obtained via an EM algorithm, that we briefly describe. The interest of the type of stochastic processes that we present comes: on the one hand, from the wide range of applications for which these processes are a flexible modeling tools; on the other hand, from the important generalization that the semi-Markov processes bring as compared to the Markov processes, that are too restrictive for a certain number of applications.

5. Luiza Bădin, Cinzia Daraio, Leopold Simar (ASE Bucureşti, ISMMA; Universitatea Sapienza Roma; Universitatea Catolică Louvain)

**Nonparametric conditional efficiency analysis with an application in the banking sector**

The performance of economic producers is often affected by external or environmental factors that, unlike the inputs and the outputs, are not under the control of the Decision Making Units (DMUs). These factors can be included in the model as exogenous variables and can help explaining the efficiency differentials and improving the managerial policy of the evaluated units. Nonparametric conditional efficiency models allow for a complete and general handling of heterogeneity, without relying on strong parametric or semi-parametric assumptions, many times unrealistic. Latest contributions in this area propose a general two-stage approach, which does not rely on the separability condition (where the input-output space is independent from the external-environmental factors that can influence only the distance of DMUs towards the efficient frontier and not the efficient frontier itself). In this paper we illustrate this nonparametric conditional methodology using a data set on US commercial banks.

6. Bogdan-Corneliu Biolan (Universitatea Bucureşti)

**An Approach of Nash Equilibrium in infinite dimension**

In this note we study a class of generalized Nash equilibrium problems and characterize the solutions which have the property that all players share the same Lagrange Multipliers.

7. Voicu Boşcaiu ("Gheorghe Mihoc - Caius Iacob" Institute of Mathematical Statistics and Applied Mathematics)

**On mean estimation using information on auxiliary variable**

Population mean estimation problem for simple random sampling will be considered using information of an auxiliary variable.

8. Mioara Buiculescu (Institutul de Statistică Matematică şi Matematici Aplicate al Academiei Române)

**On quasi-stationary distributions for continuous time general Markov processes**

We discuss the existence of quasi-stationary distributions for continuous time Markov processes with general state spaces following the approach in [1] and [2]. The main tool is the study in this context of the mapping associating with a probability measure $\mu$ on the state space of the process the unique invariant probability measure $\pi^{\mu}$ of the process obtained from the initial one by resurrection with $\mu$.

[1] A. D. Barbour and P. K. Pollett, *Total variation for quasi-equilibrium distributions*, J. Appl. Probab. 47 (2010), 934-946.
[2] P.A. Ferrari, H. Kesten, S. Martinez and P. Picco, *Existence of quasi-equilibrium distributions. A renewal dynamical approach*, Ann. of Probab. 23 (1995), 501-521.

9. Daniel Ciuiu (Universitatea Tehnica de Constructii Bucuresti; Institutul de Prognoza Economica)

**A Jackson Queueing Network Model using Poisson Measures. Application to a Bank Model**

In this paper we will build a bank model using Poisson measures and Jackson queueing networks. We take into account the relationship between the Poisson and the exponential distributions, and we consider for each credid/deposit type a node where the shocks are modeled as compound Poisson processes. The transmisions of the shocks are modeled as moving between nodes in Jackson queueing networks, the external shocks are modeled as external arrivals, and the absorbsion of shocks as departures from the network. Aknowledgement: This paper is suported by the Sectorial Operational Programme Human Resources Development (SOP HRD), financed from the European Social Fund and by the Romanian Government under the contract number SOP HRD/89/1.5/S/62988.

10. Cristina Cânepă

**Numerical simulation of defaults in large banking systems**

We develop a new theoretical model of the federal funds market, as well as some algorithmic techniques for evaluating the influence of different monetary policies on the evolution of the banking system. We model the federal funds market as a dynamic system with many interacting institutions (banks) and a central entity (the Fed). At the macro level, the model is parametrized by the number of banks, the distribution of the banks' asset sizes, and a monetary policy. The policy is a set of parameters and regimes imposed by the central entity (Fed-imposed interest rates, reserve requirements, rules). At the micro level, each bank is characterized by: its asset size process and an excess reserve process. The parameters of the model are obtained by studying real data on the asset sizes, on the transaction costs and on the deposit processes.

11. Dragoş-Pătru Covei (Constantin Brâncuşi University of Târgu Jiu)

**Boundedness and blow-up of solutions for a nonlinear elliptic system arising in stochastic processes**

12. Silvia Dedu (ASE Bucureşti)

**Optimization of some risk measures in reinsurance**

We introduce Limited Value-at-Risk and Limited Conditional Tail Expectation risk measures and investigate estimation methods in case no analytical formulas can be derived. The aggregate loss corresponding to the Stop-Loss reinsurance model is evaluated, using Limited Value-at-Risk and Limited Conditional Tail Expectation measures. We consider various restricted optimal retention problems in Stop-Loss reinsurance and obtain necessary and sufficient conditions for the existence of the optimal solution.

13. Sorin Demetriu, Radu Văcăreanu, Florin Pavel (Universitatea Tehnică de Construcţii Bucureşti)

**Prediction models for earthquake ground motion parameters**

The predictive models to estimate Peak Ground Acceleration (PGA) and Response Spectral Acceleration (SA) parameters are expressed as functions of the moment magnitude, site-source distance and focal depth. The ground-motion prediction equations (GMPEs) referred as empirical attenuation relations were fitted using linear and nonlinear multivariate regression analyses for a database of earthquake motion records from the Vrancea source. These models estimated from the Vrancea subcrustal earthquake data are compared with the models developed from strong-motion earthquake data recorded in subduction zones.

14. Maria Crina Diaconu

**Metode statistice în teoria sondajelor**

15. Mircea Drăgulin

**Asupra unor clase de modele statistice de fiabilitate**

16. Cornelia Enăchescu (Academia Română)

**Ranking conference proceedings for evaluating scientific performance. A Machine Learning Approach**

In computer science, an important part of new scientific results are published in conference proceedings. In the evaluation of the performance of a researcher, it is necessary to rank these proceedings. This need is even more pressing since ERA dropped to do it. In this communication we propose machine learning techniques for achieving this goal.

17. Aurelia Florea, Eugen Păltănea (Universitatea din Craiova, Universitatea „Transilvania” din Braşov )

**Some properties of convex order**

We present some convex ordering properties of mixtures of distributions. We use these results to obtain a multi-dimensional Hadamard-type inequality.

18. Cristinca Fulga (Academia de Studii Economice din Bucureşti; Institutul de Statistică Matematică şi Matematică Aplicată)

**Optimization and performance evaluation in the portfolio selection problem**

In this paper we propose a quantile-based risk measure which is defined using the modified loss distribution according to the decision maker's risk and loss aversion. We establish its properties related to different classes of disutility functions using the proposed risk measure. We develop a portfolio selection model in the Mean-Risk framework and give equivalent formulations of the model generating the same efficient frontier. We investigate the practical performance of the model on a portfolio composed of some of the most representative securities of the NYSE. The advantages of this approach and the better performances of the efficient portfolios obtained by the application of the new model compared to other Mean-Risk models are discussed and empirically proven.

19. Carmen Gheorghe (National Institute of Economic Research, Romanian Academy)

**New parametric families of Leimkuhler Curves**

The definition of the Leimkuhler Curve proposed by Sarabia (2008) was the starting point of this paper. Using this recent approach we propose new parametric families of Leimkuhler Curves. A variety of properties are analysed, including Leimkuhler orderings and inequality measures. An application is presented for grouped data.

20. Manuela Ghica (Universitatea Spiru Haret)

**On a regression model with generalized Weibull distributions type**

We introduce the extended Weibull regression model based on log-linear Weibull distribution with four parameters. This new regression model includes as sub-model several classical regression models and therefore can be more useful for the analysis of lifetime problems. In this paper we estimate the parameters by the method of maximum likelihood and calculate the elements of the observed information matrix. Then, for MLE (maximum likelihood estimate), we calculate the generalized Cook distance to study the censoring effect under a case-deletion approach in global influence analysis. Keywords: Generalized Weibull; Maximum likelihood; Observed information matrix; Sensitivity analysis.

21. Sorina Gramatovici (ASE Bucureşti)

**Optimality and duality for fractional continuous programming problems**

22. Corina Grosu (Universitatea Politehnica Bucureşti)

**On some problems connected to fractional calculus**

The paper presents a time scale approach to fractional calculus and some of its applications in probability theory.

23. Iuliana Iatan, Marcel Worring (Universitatea Tehnică de Construcţii Bucureşti)

**Similarity based Fuzzy Kwan-Cai Neural Network for Multimedia Analysis**

Similarity is a crucial issue in Multimedia Analysis. It is relevant both for unsupervised clustering and for supervised classification. It is, however, difficult to define especially when aiming to combine information sources from different origin (multivariate data, image features, vector spaces etc.). In this study

we aim to provide a solid theory for defining similarity for different methods as well as their combination. To reach this aim we start of from the Fuzzy Kwan- Cai Neural Network (FKCNN) and turn it into a supervised one, in order to be applied in Multimedia Analysis. Unlike the classical unsupervised fuzzy neural network Kwan-Cai, in which a class was represented by a single output neuron, the supervised FKCNN has more output neurons that designates a class, which determines that the supervised network to be more performance than the one unsupervised. To show our new FKCNN capability we shall use it for Multimedia Analysis to measure image similarity as we are interested in image similarity in the context of multimedia. In order to emphasize the performances of our proposed neural network, it will be compared with the baseline methods: Self-organizing Kohonen maps (SOKM) and k-Nearest Neighbor rule (k-NN). The feasibility of the presented methods for similarity matching has been successfully evaluated on a Visual Object Classes (VOC) database, that consists in 10102 images and 20 object classes.

24. Bogdan Iftimie (ASE Bucureşti)

**O problemă de optimizare de portofolii într-o piaţă incompletă cu active cu salturi**

**Acknowledgement:** This research was supported by CNCS-UEFISCDI, Project number IDEI 303, code PN-II-ID-PCE-2011-3-0593.

25. Valentin Ionescu (Institutul de Statistică Matematică şi Matematică Aplicată al Academiei Române)

**Construcţii şi teoreme asimptotice într-o teorie generalizată a probabilităţilor libere cu valori operatori**

Construim produse libere amalgamate (pline şi reduse) de anumite aplicaţii de bimodule (în particular, medii condiţionate), în raport cu o familie de mulţimi de alte aplicaţii similare; implicând aplicaţii cu valori în C*-algebre diferite. Aceste obiecte permit generalizarea în raport cu un numar arbitrar de stări a noţiunii de

independenţă liberă cu amalgamare, datorată lui D. Voiculescu. Prezentăm apoi o teoremă asimptotică generală, din care deducem o teoremă limită centrală şi alta de tip Poisson, pentru variabile aleatoare cuantice corespunzătoare. Astfel extindem rezultate ale noastre expuse anterior.

26. Alexei Leahu, Bogdan Gheorghe Munteanu ("Ovidius" University of Constanţa, Romania; "Henri Coandă" Air Forces Academy, Braşov, România)

**On the convolutions of power series type**

The lifetime represented as the random sum of the random variables (r.v.) is found in many issues related to Reliability, Actuarial, Queuing Theory, Renewal Theory. In our work we intend to research the lifetime distribution when the random number of r.v. has a power series distribution, abbreviated as PSD, the components of the sum being independent and identically distributed random variables, nonnegative, of (absolutely) continuous type. Results are expressed through generating function and Laplace transform. These results are used, as an illustration, for the demonstration/validation of limit theorems.

27. Marinela Marinescu, Daniela Ijacu (ASE Bucureşti)

**A filtering problem for SDEs with jumps**

In this paper we describe the evolution of the conditioned mean value using backward parabolic equations with parameters. Our main assumption is the commuting property of the drift and diffusion vector fields with respect to the usual Lie bracket. The general method used here relies on piecewise smooth test function constructed as fundamental solutions for some quasilinear (Hamilton-Jacobi) equations with jumps.

**Acknowledgement:** This research was supported by CNCS-UEFISCDI, Project number IDEI 303, code PN-II-ID-PCE-2011-3-0593.

28. Toni-Cătălin Mihalcea (Universitatea Bucureşti)

**Second-order optimality conditions for multiobjective optimization problems with fuzzy-valued objective functions**

In this paper, we present second-order optimality conditions for multiobjective optimization problems with fuzzy-valued objective functions. The solution concepts proposed in this paper will follow from the similar solution concept, called Pareto optimal solution, in the conventional multiobjective programming problems. First, we introduce the optimality conditions for multiobjective programming problems with fuzzy-valued objective functions and then, we present a second-order sufficient condition for a isolated local minima of order 2 to a fuzzy multiobjective problem.

29. Iulian Mircea, Mihaela Covrig (ASE Bucureşti)

**A method for estimate of the risk reserve in insurance**

In insurance business, estimating the risk reserve is of theoretical interest too, mainly due to of the stochastic elements which should be considered. Compared to other calculation methods based mainly on the normal asymptotic behavior of sums of independent random variables, and on the well-known Chebyshev's inequality, we propose a new method that replaces the standard deviation with a large deviation. This method uses the exponential form of the Chebyshev's inequality, the Cramer transform of the distribution function, martingale inequalities and the martingale convergence. By analyzing the expected volume of claims and the number of observations, the proposed method is preferable when considering very small probabilities of exceeding the reserve.

**Acknowledgement:** This research was supported by CNCS-UEFISCDI, Project number IDEI 303, code PN-II-ID-PCE-2011-3-0593.

30. Romeo Negrea (Universitatea Politehnica din Timisoara)

**On Numerical Approximations for Solutions of Backward Stochastic Differential Equations**

We propose a method for numerical approximation of the solutions of backward stochastic differential equations in some non-lipschitz conditions for the coefficient functions. Given a simulation-based estimator of the conditional expectation operator, then we suggest a backward simulation scheme. Our explicitly method is simple to implement and it relies on approximation of Brownian motion by simple random walk.

31. Monica Patriche (Universitatea din Bucureşti)

**Fixed point theorems and applications**

We introduce the notions of weakly *-concave and weakly naturally quasi-concave correspondence and prove fixed point theorems and continuous selection theorems for these kind of correspondences. As applications in the game theory, by using a tehnique based on a continuous selection, we establish new existence results for the equilibrium of the abstract economies. The constraint correspondences are weakly naturally quasi-concave. We show that the equilibrium exists without continuity assumptions.

32. Valentin Paţilea (ENSAI)

**Parametric inference in conditional moment equations models**

Many statistical models, like mean regression, quantile regression, transformation models, could be written under the form of conditional moment equations. The estimation method we consider is based on the minimization of a distance criterion under the form of a quadratic form inspired by kernel smoothing. We review several aspects related to this inference approach. First, an

asymptotic representation of the minimum distance criterion estimator is presented. This representation could be derived even if the model is misspecified. Next, we show how the approach could be applied when data are incomplete, for instance when the response is censored. Finally, we consider a non-asymptotic point of view for studying the minimum distance estimator, in particular we provide a concentration bound.

33. Udrea Păun (Academia Română)

**Some properties of a waiting time random variable**

Let $X$ be the waiting time of pattern ss...s of length $k$ ($k$>0) in an s-f sequence of trials (s - success, f - failure). Based on ergodicity coefficients, etc. we give some properties of $X$.

34. Viorel Petrehuş, Romică Trandafir, Sorin Demetriu (Universitatea Tehnică de Construcţii Bucureşti)

**Reliability assessment for the multicomponent and multistate k-out-of-n: G systems**

The multicomponent and multistate k-out-of-n: G systems are presented in this paper. The survival probabilities of components and the reliability of the system are evaluated considering the strengths and the stresses of components represented by independent random variables with the same cumulative distribution functions or with different cumulative distribution functions. Analytical results are illustrated for some distributions and validated by Monte Carlo simulation.

35. Ciprian Popescu (ASE Bucureşti)

**About the orthogonal regression and some of its economic applications**

In this paper some theoretical and practical aspects regarding some types of regression are discussed. Particularly, some economic applications of the orthogonal regression are investigated.

36. Georgiana Constanţa Popovici, George Andrei Pădureanu (Universitatea Bucureşti)

**Analiză statistică şi modele tip Customer Intelligence. Un model semiparametric pentru probabilitatea de succes a vânzărilor**

Modelarea stochastica in marketing capata valoare tot mai mare din punct de vedere al gestionarii diferitelor fenomene. Problema abodata este una legata de gestionarea clientilor intr-o companie de telecomunicatii, de apetenta pentru cumpararea unui produs. Traditional se folosesc modele parametrice, anume regresie cu raspuns binomial (binar: Da/ Nu). Lucrarea prezinta aceasta abordare ca prima varianta de lucru. Ne propunem trecerea la un model semiparametric (componenta neparametrica spline cubic), pentru o analiza mai rafinata a efectului covariatelor asupra variabilei raspuns (succesul vanzarii).

37. Georgiana Constanţa Popovici, George Andrei Pădureanu (Universitatea Bucureşti)

**O aplicaţie a unui test tip entropie maximă**

38. Vasile Preda, Costel Bălcău (Universitatea Bucureşti, Universitatea din Piteşti)

**Applications of weighted entropy optimization models in transportation planning**

Weighted entropy programming methods are applied to solve some transportation planning problems

39. Vasile Preda, Cristian Niculescu, Toni Mihalcea (Universitatea Bucureşti)

**Second-order optimality conditions in multiobjective optimization**

40. Ana Maria Răducan (Institutul de Statistică Matematică şi Matematică Aplicată Caius Iacob - Gheorghe Mihoc)

**Recursive expressions for ruin probability in discret case**

In particular discret cases the ruin probability can be determined in a recursive manner. Further more, this allows us to obtain inequalities related to this probability.

41. Marius Rădulescu, Sorin Rădulescu, Constanţa Zoie Rădulescu (Institutul de Statistică Matematică şi Matematică Aplicată)

**The efficient frontiers of parametric optimization problems**

In the paper we associate the notions of efficient frontier set and efficient frontier map to a parametric optimization problem. Several mean-risk models are investigated. We are interested in conditions that imply that the efficient frontier sets of the minimum variance type problems and of the maximum expected return type problems are equal.

42. Elena Robe-Voinea, Raluca Vernic (Universitatea Ovidius Constanţa)

**Fast Fourier Transforms for bivariate aggregate losses. A Matlab application**

In insurance, directly evaluating the distribution of aggregate losses is an important task, which becomes difficult in a multivariate setting. As a consequence, alternative approximate methods such as the Fast Fourier Transform (FFT) were suggested. In this work, we consider three different compound models for aggregate losses, which can be evaluated using FFT. We implemented the resulting algorithms in the mathematical software Matlab.

43. Alin Marian Rusu (Universitatea Bucureşti)

**On the Beta Moyal Generalization**

We propose the so called beta Moyal generalised distribution that generalizes the beta Moyal distribution and study its properties. Thus expansions for the cumulative distribution function as power series of the Moyal cumulative distribution are to be presented.

44. Mariana Sibiceanu (ASE Bucureşti, ISMMA Academia Română)

**Sufficient conditions for the applicability of the rate function formula in the Large Deviation Principle for Markov processes**

We consider a sequence of Markov processes satisfying the LDP in the space of R-valued cadlag functions on the non-negative reals, endowed with the Skorokhod topology.Under the assumption that the domains of the associated infinitesimal generators are C(b)(R), we give sufficient conditions for the applicability of the rate function formula provided by J.Feng and T.Kurtz (2000), Large Deviations for Stochastic Processes.

45. Emil Simion (Universitatea Politehnica din Bucureşti)

**Improvement of NIST statistical tests**

In this paper we propose an improvement of the decision regarding the randomness, proposed by National Institute of Standards and Technologies (NIST) in the guideline Statistical Test Suite (STS) Special Publication (SP) 800-22, on computing the second order error (the probability of acceptance a false hypothesis).

46. Ovidiu Solomon, Marius Giuclea, Ana Maria Mitu (Universitatea Româno-Americană, ASE Bucureşti, Institutul de Mecanica Solidelor)

**Stochastic linearization of systems with hysteretic characteristics**

In this paper is presented a linearization method for a stochastic differential system with hysteretic characteristics and random excitation. The Gaussian equivalent linearization technique is applied to a Bouc-Wen model identified from experimental data. In order to verify the efficiency of the method, the r.m.s. response of the equivalent linear system is compared with the response obtained by numerical simulation of Bouc-Wen nonlinear system excited by the same Gaussian white noise input.

47. Andreea Mădălina Stancu, I.M. Stancu-Minasian (ISMMA)

**Semilocally type-I univex functions and multiobjective fractional programming**

Based on the generalized rho-semilocally type-I univex functions we derive sufficient optimality conditions for a nonlinear multiobjective fractional programming problem. Duality theorems are proved for a general dual problem under the generalized rho-semilocally type-I univexity assumptions. Many known results are particular cases of this work.

48. Stelian Stancu, Alexandra Maria Constantin (ASE Bucureşti)

**Probabilistic independence and conditioning in economic mathematical modelling**

Probabilistic independence and conditioning in mathematical modeling must be associated to the complexity of phenomenon and interdependent relations between cause and effect type components, at a phenomenon level. Thus, the current paper has multiple specific objectives: presenting the complexity of phenomenons, presenting the independence and probabilistic conditioning in mathematical modelling in economics, presenting a mathematical model to be used when studying economic phenomenon on a micro-economic status and last, presenting the conclusions.

49. Florentin Şerban (ASE Bucureşti)

**Construcţia unui portofoliu reprezentativ pentru BVB cu ajutorul Analizei în Componente Principale**

Acest articol prezintă o modalitate de construcţie a unui portofoliu care să caracterizeze Bursa de Valori Bucureşti. Construcţia sa este realizată folosind Analiza în Componente Principale. Avantajul construirii unui astfel de portofoliu este acela că presupune un efort financiar mult mai mic comparativ cu achiziţionarea acţiunilor ce compun indicele BET, performanţa acestui portofoliu fiind similară cu cea a indicilor reprezentativi pentru Bursa de Valori Bucureşti.

50. Ştefan Ştefănescu (University of Bucharest)

**Methods for classifying the economic and social indicators**

We suggested more techniques to find out the relations between some economic and social indicators. Different dissimilarity measures were chosen to classify fourteen social indicators A-N which characterize partly the quality of life in Romania-2010. We obtained comparable results independently on the selected dissimilarity coefficient. One or two antithetic referential variables established correctly the real position of the components A-N. Taking into consideration a partial relation of order inside the system A-N there were finally emphasized six interaction levels for the variables A-N.

51. Aida Toma, Amor Keziou (ASE Bucureşti, ISMMA; Université de Reims Champagne-Ardenne)

**Robustness of dual divergence estimators for moment condition models**

We present estimation and test procedures for models satisfying linear constraints with unknown parameter. These procedures extend the empirical likelihood method and share common features with the generalized empirical likelihood method. The approach is based on duality techniques and divergence projections of probability distributions on sets of signed finite measures. We prove that, in some cases, for various divergences, the new approach provides robust estimations and test procedures, unlike the empirical likelihood method. We give general results using the influence function approach, which we exemplify in the case of the Cressie-Read divergences. Some perspectives for extending these results are also presented.

53. Maria Tudor, Cristiana Tudor (ASE Bucureşti)

**On the forecasting performance of symmetric and asymmetric conditional volatility models: in-sample and out-of-sample analysis**

The forecasting performance of three conditional volatility models (namely GARCH, EGARCH and FIEGARCH) is investigated on the Romanian stock market both in-sample and out-of-sample. The analysis period is 6.12.1996-27.06.2011, thus containing 3796 daily returns for the Romanian composite BET-C stock index, while the source of data is Thompson Reuters' Datastream. The method employed is a dynamic 100 steps-ahead forecast. Following calibration of the three conditional volatility models forecast error statistics calculated are: the mean error *or ME*, the mean squared error or *MSE*, the root mean squared error or *RMSE*, the mean absolute error or *MAE*, the mean percentage error or *MPE* and the mean absolute percentage error or *MAPE*. Empirical results attest that the model which performs best in explaining conditional volatility within the sample (as revealed by the log-likelihood function) is the fractional FIEGARCH model, followed by the asymmetric EGARCH model and the standard GARCH (1,1), while for the out-of-sample forecasting the best performing model is the standard GARCH (1,1), which has the lowest values for the forecast error statistics. The econometric investigations in this research use the software programs Eviews 7.1 and OxMetrics 6.0.

**Acknowledgement:** This research was supported by CNCS-UEFISCDI, Project number IDEI 303, code PN-II-ID-PCE-2011-3-0593.

52. Cristiana Tudor (ASE Bucureşti)

**Long memory in stock returns volatility: empirical estimation on the Bucharest Stock Exchange**

This paper examines the dynamics of stock returns volatility on the Romanian equity market by estimating the parameters of the

Fractionally Integrated EGARCH Model. Our data set contains 3796 daily observations for the Bucharest Stock Exchange composite index BET-C. Further, daily returns are computed as logarithmic price relatives: $R_t = \ln(P_t)/\ln(P_{t-1})$, where $P_t$ is the daily price at time $t$. The FIEGARCH calibration on empirical data reveals that ARCH and GARCH effects are present and statistically significant, with GARCH effects which indicate volatility clustering more pronounced than ARCH effects. Moreover, we also investigate the presence of asymmetric effects on our time series, but the estimation results reveal a statistically insignificant asymmetry coefficient, therefore suggesting an equal impact of positive and negative shocks on future stock volatility. Finally, the fractional differential parameter d which reflects the long memory has a value of 0.73 and is statistically significant. Overall, we report clear evidence of volatility persistence and conclude that past volatility contains useful information that can be used to predict future volatility for stock returns on the Bucharest Stock Exchange.

**Acknowledgement:** This research was supported by CNCS-UEFISCDI, Project number IDEI 303, code PN-II-ID-PCE-2011-3-0593.

54. Vasile Silviu Laurenţiu (ISMMA, FMI)

**Some aspects of clinical trials**

55. Ion Văduva (Universitatea Bucureşti)

**On some mixed distributions involved in Life Data Analysis**

The paper introduces some probability distributions which are mixtures between distributions of minimum and maximum of sequences of life data having Lomax(Pareto)or Weibull distributions, mixed up with truncated geometric or Poisson Distributions.These distributions could be used to calculate reliability of multicomponent serial or parallel systems. Apart from composition methods for simulating these distributions, some other simulation algorithms, bases on inverse or rejection methods, are presented.

56. Raluca Vernic (Universitatea Ovidius Constanţa)

**On the bivariate Sarmanov distribution with log-logistic marginals: an actuarial application**

In the attempt to find a better model for a bivariate data set of insurance claims, we introduced the bivariate Sarmanov distribution with log-logistic marginals. Compared to other bivariate Sarmanov distributions with different marginals, this distribution proved to better model the tail of the empirical distribution. This is important when it comes to evaluating insurance risk measures related to the tail, avoiding thus the underestimation of future liabilities.

57. Ovidiu Vegheş, Cristian Neculăescu (ASE Bucureşti)

**Instrumente software pentru Programare Liniară**

58. Gheorghiţă Zbăganu (Universitatea Bucuresti)

**Lorenz Curve and mysteries of order statistics**

Divide at random a segment into $n$ smaller segments. We get a stochastic vector, $X$. If its distribution is symmetric, all its components are negatively correlated.Sort the components of $X$ from the smaller one $Y(1)$ to the greatest one, $Y(n)$. If the distribution of $X$ is uniform on the n-dimensional standard simplex, then about 62% among the smaller components of $Y$ are positively correlated with $Y(1)$ and a smaller proportion, tending to 0 of them positively correlated with $Y(n)$. The Lorenz curves associated to $Y$ tend to $L(t) = t + (1-t)\log(1-t)$ and its Gini coefficient tend to 0.5. We try to investigate what happens if the distribution of $X$ is not uniform.

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