



**UNIVERSITATEA
BUCUREȘTI
Facultatea de
Matematică și
Informatică**



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



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

**A 15-a CONFERINȚĂ A SOCIETĂȚII DE PROBABILITĂȚI
ȘI STATISTICĂ DIN ROMÂNIA**

Dedicată memoriei profesorului Constantin Tudor

**Universitatea București
Facultatea de Matematică și Informatică
Vineri 27 aprilie 2012**

**SPONSOR PRINCIPAL: CENTRUL DE CERCETĂRI MATEMATICE AVANSATE
FUNDAMENTALE ȘI APLICATIVE ASE BUCUREȘTI**

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PROGRAMUL CONFERINȚEI SPSR 2012

Secțiuni:

1. Probabilități și Procese Stocastice
2. Statistică
3. Optimizări
4. Matematici Financiare, Actuariat

Vineri 27 aprilie 2012
Amfiteatrul *Spiru Haret*

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

9:45 – 10:00 Pauză

10:00 – 12:00 *In memoriam: Constantin Tudor*
Conduce: Ioan Cuculescu

- Prof. Ioan Cuculescu, membru corespondent al Academiei Române
- Prof. Ciprian Tudor, Université de Lille
- Prof. Lucian Beznea, directorul Institutului de Matematică al Academiei Române

12:00 – 14:30: masa la Casa Universitarilor

14:30 – 15:00: *Conferință generală* (Amfiteatrul Spiru Haret)
Conduce: Monica Dumitescu

Ioana Schiopu Kratina (Statistics Canada/University of Ottawa)

Optimizarea intersecției eșantioanelor selecționate în două anchete diferite

15:15 – 18:30: **Comunicări pe secțiuni**

19:00 – 21:00: **Cină festivă** (Casa Universitarilor)

COMUNICĂRI PE SECȚIUNI Vineri 27 aprilie

Secția Probabilități și Procese Stocastice (Amfiteatrul Spiru Haret)

Conduce: Mioara Buiculescu

15:15 – 15:30

Claudia Zaharia (Universitatea de Vest din Timișoara)

On the completeness of random normed spaces

15:30 – 15:45

Romeo Negrea (Universitatea Politehnică din Timișoara)

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

15:45 – 16:00

Alexei Leahu, Bogdan Gheorghe Munteanu (Universitatea "Ovidius" Constanța, Academia Forțelor Aeriene "Henri Coandă" Brașov)

Erlang Approximation on Pascal Convolution

16:00 – 16:15

Eugen Păltănea (Universitatea Transilvania din Brașov)

Recent advances in stochastic comparison of parametric families of distributions

16:15 – 16:30

George Haiman, Cristian Preda (Université de Lille 1)

1-dimensionnal scan statistics generated by some dependent stationary sequences

16:30 – 16:45

Udrea Păun (Romanian Academy)

Upper bounds for $P(X < k)$ and $P(X = k)$

16:45 – 17:00 – Pauză

Conduce: George Haiman

17:00 – 17:15

Mariana Sibiceanu (Academia Română)

Asymptotic exponential inequalities for empirical measures corresponding to distanced terms of a mixing sequence

17:15 – 17:30

Mioara Buiculescu (Institutul de Statistică Matematică și Matematică Aplicată al Academiei Române)

Asymptotic properties for a class of non-singular Feller processes

17:30 – 17:45

Mioara Varga (Universitatea de Științe Agronomice și Medicină Veterinară București)

A stochastic epidemic model with variable population size

17:45 – 18:00

Alin Rusu (Universitatea din București)

On a Maxentropic Deformation of Entropy

18:00 – 18:15

Bogdan Sebacher (Universitatea Tehnică de Construcții București)

Complex geology estimation using EnKF. A probabilistic approach

18:15 – 18:30

Aurelia Florea (Universitatea din Craiova)

On shock models in reliability

Sectia Statistică

(Sala de Consiliu)

Conduce: Aida Toma

15:15 – 15:30

Marina Cidota, Monica Dumitrescu (Universitatea din București)

Extensions of Hidden Markov Models for Communication Systems

15:30 – 15:45

Romica Trandafir (Universitatea Tehnică de Construcții București)

Confidence Intervals in Hydrology Using Polynomial Regression

15:45 – 16:00

Sorin Demetriu (Universitatea Tehnică de Construcții București)

Energy Spectra of non-stationary Motion Records from recent Earthquakes

16:00 – 16:15

Letiția Velcescu, Laurențiu Vasile (Universitatea din București)

Optimization of a set of database queries based on an estimation of the selectivity factor

16:15 – 16:30

Ștefan Ștefănescu (Universitatea din București)

Benini's model applied to analyze the income distributions

16:30 – 16:45

Valentin Pașilea (CREST)

Projection-based nonparametric goodness-of-fit testing with functional data

16:45 – 17:00 – Pauză

Conduce: Valentin Pașilea

17:00 – 17:15

Alexandru Amarioarei (Universitatea Lille 1)

Approximation for the three dimensional scan statistics distribution

17:15 – 17:30

Aida Toma, Samuela Leoni-Aubin (ASE București și ISMMA, INSA Lyon, ICJ)

Minimum pseudodistance estimators of multivariate location and scatter and applications

17:30 – 17:45

Gheorghe Carmen, Vasile Preda, Corina Cipu (Universitatea București)

The Estimate of Generalized Lorenz Confidence Intervals Using Exponentiated Weibull Distribution

17:45 – 18:00

Luiza Bădin, Cinzia Daraio, Leopold Simar (ASE București și ISMMA, Universitatea Sapienza din Roma, ISBA UCL Belgia)

Explaining inefficiency in conditional nonparametric frontier models

18:00 – 18:15

Denis Enăchescu, Vinicius da Silva Almendra (Universitatea București)

Why fraudsters choose certain categories of products? An analysis of non-delivery fraud at a major online auction site

18:15 – 18:30

Voicu Boscaiu (ISMMA)

Asupra corelației unor sume de variabile

**Sectia Cercetări operaționale și optimizare
(Sala 214)**

Conduce: Ion Stancu Minasian

15:15 – 15:30

Vasile Preda, Costel Bălcău (Universitatea București, Universitatea din Pitești)

Convex quadratic semi-infinite programming with weighted entropic perturbation

15:30 – 15:45

Vasile Preda, Cristian Niculescu (Universitatea București)

Maximizing the generalized entropy with certain grade correlation coefficients

15:45 – 16:00

Toni Mihalcea (Universitatea București)

Optimality conditions and duality in multiobjective optimization involving generalized type I functions

16:00 – 16:15

Diana-Elena Stanciu (Universitatea București)

On the continuity of the solutions set of a class of quasivariational inequalities

16:15 – 16:30

Ciprian Popescu, Marius Giuclea (ASE București)

On mathematical optimization

16:30 – 16:45

Popescu Sever-Angel (Universitatea Tehnică de Construcții București)

OREL Software: Learning and Knowledge Verification

16:45 – 17:00 – Pauză

Conduce: Cristian Niculescu

17:00 – 17:15

Monica Patriche (Universitatea din București)

Equilibrium for multicriteria games in abstract convex spaces

17:15 – 17:30

Ovidiu Vegheș (Academia de Studii Economice)

Continuity properties of a solution in cooperative games

17:30 – 17:45

Daniela Ijacu, Marinela Marinescu (Academia de Studii Economice, București)

About stochastic differential games with Nash equilibrium solutions

17:45 – 18:00

Andreea Mădălina Stancu, Ioan M. Stancu-Minasian (Institutul de Statistică Matematică și Matematică Aplicată al Academiei Române)

Duality in multiobjective subset programming problems involving generalized d-type I univex functions

**Sectia Matematici financiare si actuariat
(Sala 219)**

Conduce: Iulian Mircea

15:15 – 15:30

Gheorghiu Zbăganu (Universitatea București)

On negative dependence and portfolios

15:30 – 15:45

Marius Rădulescu (Institute of Mathematical Statistics and Applied Mathematics, Bucharest), Sorin Rădulescu, Constanța Zoie Rădulescu (National Institute for Research and Development in Informatics, Bucharest)

Mean-variance models with complementarity constraints

15:45 – 16:00

Silvia Dedu, Cristina Fulga (ASE București)

Quantile-based risk optimization with prior stock selection for asset allocation

16:00 – 16:15

Silvia Dedu (ASE București)

Optimization of some risk measures in Stop-Loss reinsurance with multiple retention levels

16:15 – 16:30

Raluca Vernic and Elena Pelican (Universitatea Ovidius Constanța)

Statistical inference for the bivariate Sarmanov distribution: a real data study

16:30 – 16:45

Ilie Marinescu (Universitatea București)

A Chance Constrained Portfolio Problem with Weibull Fuzzy Distribution

16:45 – 17:00 – Pauză

Conduce: Raluca Vernic

17:00 – 17:15

Iulian Mircea, Mihaela Covrig (Academia de Studii Economice din București)

Some Approximations of Ruin Probability in a Risk Model

17:15 – 17:30

Muhammad Sheraz (University of Bucharest)

On GARCH and Stochastic Volatility Modeling

17:30 – 17:45

Florentin Șerban (ASE București)

Technical analysis of the stocks

17:45 – 18:00

Manuela Ghica (Universitatea Spiru Haret)

A game theoretic model for a reinsurance model

REZUMATE

1. Amarioarei Alexandru (Universitatea Lille 1)

Approximation for the three dimensional scan statistics distribution

We consider the discrete three dimensional scan statistics. Viewed as the maximum of an 1-dependent stationary r.v.'s sequence, we provide approximations and error bounds for the probability distribution of the scan statistics. Simulation results and comparisons with other approximations are presented for the binomial and Poisson models.

2. Luiza Bădin, Cinzia Daraio, Leopold Simar (ASE București si ISMMA, Universitatea Sapienza din Roma, ISBA UCL Belgia)

Explaining inefficiency in conditional nonparametric frontier models

In this paper we develop a nonparametric production model where the role of the environmental factors is explicitly introduced in a non restrictive way, through conditional efficiency measures. The paper first extends previous research on conditional measures by showing that a careful analysis of both full and partial conditional efficiency measures allows us to disentangle the impact of environmental factors on the production process in its two components: impact on the attainable set in the input-output space, and/or impact on the distribution of the efficiency level. Inference tools are then proposed by adapting appropriate bootstrap algorithms. Second, for the first time, the impact of environmental factors on the production process is also examined by using a novel two-stage type approach on conditional measures of efficiency, to avoid the limitations of the traditional two-stage analysis. Our approach also

provides a measure of inefficiency whitened from the main effect of the environmental factors. This allows us to rank the firms according to their managerial efficiency, even when facing heterogeneous environmental conditions.

3. Costel Bălcău, Vasile Preda (Universitatea din Pitești, Universitatea București)

Convex quadratic semi-infinite programming with weighted entropic perturbation

We apply a weighted entropic perturbation and the cutting plane method for ε -optimal solving of a convex quadratic semi-infinite programming problem.

4. Voicu Boscaiu (ISMMA)

Asupra corelației unor sume de variabile

Punctul de plecare al discuției este următoarea întrebare simplă: În ce situații are loc inegalitatea

$$\text{corr}(X + Y, Z) > \max\{\text{corr}(X, Z), \text{corr}(Y, Z)\}?$$

5. Mioara Buiculescu (Institutul de Statistică Matematică și Matematică Aplicată al Academiei Române)

Asymptotic properties for a class of non-singular Feller processes

We consider Feller processes subject to the conditions of non-singularity and fast explosion. The non-singularity condition refers to the fact that some (and hence any) skeleton of the process is irreducible; it can be equivalently expressed in terms of the semigroup of the process. It is shown that for such processes

asymptotic results of large deviations type hold. Stronger conditions imposed by Takeda in a similar context (absolute continuity and symmetry) are removed. As a consequence we obtain the equality of the decay parameter of the process to the spectral radius of the semigroup on bounded functions.

6. Marina Cidota, Monica Dumitrescu (Universitatea din București)

Extensions of Hidden Markov Models for Communication Systems

A Hidden Markov Model (HMM) is a doubly stochastic process with an underlying stochastic process that is not observable (it is hidden), but can only be observed through another set of stochastic processes that produce the sequence of observed symbols. It is quite natural to consider that the evolution of the hidden Markov chain could be influenced by some external "catalyzers" (e.g. environmental or experimental conditions). This paper discusses two extensions of Hidden Markov models, assuming that the stochastic influence of the catalyzers is expressed by logistic or multinomial link functions. Both Logistic HMM (LHMM) and Multinomial HMM (MHMM) can be useful in bioinformatics for modeling the behaviour of the calcium channel. These models are trained with the Baum - Welch algorithm as a framework, but the optimization problems involved require some methods from statistical inference. Simulation studies have been performed for both models, certifying the stability and the good performances of the proposed training procedures (this work was supported by the strategic grant POSDRU/89/1.5/S/58852, Project "Postdoctoral programme for training scientific researchers" cofinanced by the European Social Found within the Sectorial Operational Program Human Resources Development 2007-2013).

7. Silvia Dedu (Academia de Studii Economice București)

Optimization of some risk measures in Stop-Loss reinsurance with multiple retention levels

We propose the Stop-Loss reinsurance model with multiple retention levels and obtain an analytical formula for the reinsurance premium. Value-at-Risk and Conditional Tail Expectation of the aggregate loss are derived in this case. We build two optimization problems associated to this model, based on minimizing Value-at-Risk and Conditional Tail Expectation risk measures and study the existence of the optimal solution. Necessary and sufficient conditions for the existence of the optimal retention are provided.

8. Silvia Dedu, Cristinca Fulga (Academia de Studii Economice București)

Quantile-based risk optimization with prior stock selection for asset allocation

We develop an integrated portfolio selection method with risk estimation and optimization in the mean-risk framework. The algorithm proposed follows three steps. The first one, stock selection, uses principal component analysis and clustering techniques to build classes of similar assets. In the second, Value-at-Risk (VaR) is used to evaluate risk and the asset with minimal VaR is selected from each class. In the third step the selected assets are used to build the optimal portfolio, solving a mean-VaR optimization problem. The original nature of our work stands in combining classification theory with risk estimation and optimization techniques. The optimization process improves, because it starts with an initial portfolio composed by a wide range of minimal risk assets. This method will be used to build an optimal portfolio of assets from Bucharest Stock Exchange and to derive the efficient frontier.

9. Sorin Demetriu (Universitatea Tehnică de Construcții București)

Energy Spectra of non-stationary Motion Records from recent Earthquakes

Time-frequency representations are considered for energetic characterization of seismic non-stationary time series. The energy spectra describe the temporal evolution of frequency content and the frequency dependence of effective duration of earthquake motions. The analyzed data includes translational components of acceleration on three orthogonal directions of motion recorded in different site conditions during recent great earthquakes: the 2011 Tohoku – Pacific Coast Earthquake in Japan and the 2010 Maule Earthquake in Chile. The jointly time-frequency energy distributions are considered to evaluate the destructive potential of seismic records.

10. Denis Enăchescu, Vinicius da Silva Almendra (Universitatea București)

Why fraudsters choose certain categories of products? An analysis of non-delivery fraud at a major online auction site

Although fraud at online auction sites, particularly non-delivery fraud, is a well-known problem, there are very few empirical studies about it, mostly due to the lack of publicly available data. In this work we present a quantitative analysis of a one-year long data collection at a major online auction site trying to answer the question in the title. Our results put grounded figures on the fraud phenomenon at online auction sites and help judging how relevant it is.

11. Aurelia Florea (Universitatea din Craiova)

On shock models in reliability

We study some aspects regarding the shock models in reliability theory. Particularly, we refer to the recently developed extreme shock models. We propose here some extensions and numerical examples.

12. Florentin Șerban (Academia de Studii Economice București)

Technical analysis of the stocks

Various methods of analyzing the value of the stocks are called, in a general characterization, titles evaluation. Technical analysis is a method of predicting price movements and future market trends by studying charts of the stocks which take into account stock prices and trading volumes. This paper discusses some of the most important indicators used in the technical analysis of stocks. (Acknowledgement. This work was co-financed by European Social Fund Operational Programme Human Resources Development 2007-2013, the number POSDRU/89/1.5/S/59184 "Performance and excellence in postdoctoral research in economic science in Romania".)

13. Carmen Gheorghe, Vasile Preda, Corina Cipu (Universitatea București)

The Estimate of Generalized Lorenz Confidence Intervals Using Exponentiated Weibull Distribution

In this paper we discuss a new confidence interval estimation method. We obtain the estimate of Generalized Lorenz Confidence Intervals using Exponentiated Weibull distribution. Simulation

results show that the EWD confidence intervals have better coverage probabilities than the WD.

14. Manuela Ghica (Universitatea Spiru Haret)

A game theoretic model for a reinsurance model

We propose a game-theoretic model for a reinsurance market. We introduce some core catcher sets and for negative exponential and power utility functions we give some representations.

15. George Haiman, Cristian Preda (Université de Lille 1)

1-dimensionnal scan statistics generated by some dependent stationary sequences

A method of approximating the distribution of scan statistics for i.i.d. random variables was presented by the authors in previous papers. The method can be applied to 1-dependent stationary sequences. We apply this method to a parametric model of 1-dependent Bernoulli sequences introduced recently by the first author and to 1-dependent stationary Gaussian sequences. We compare the results with the distributions of scan statistics generated by sequences of corresponding i.i.d. random variables with same marginal distribution and for Markov sequences of Bernoulli random variables.

16. Daniela Ijacu, Marinela Marinescu (ASE and IMAR, București)

About stochastic differential games with Nash equilibrium solutions

In this paper we present in detail an example of differential game with stochastic perturbations associated with solutions of Nash

equilibrium and open loop strategies. The calculus can be explained as an algorithm if the hypothesis (H) on the diffusion coefficients is personalized as linear fields with constant coefficients. The necessary conditions for Nash equilibrium solutions can be obtained using variation calculus and Hamilton-Jacobi equations associated with optimal control problem. An optimal control problem, usually, is defined by the same elements as a differential game with open loop strategies, with the difference that, this time, we have just one functional which must be minimized in comparison with admissible comands.

17. Alexei Leahu, Bogdan Gheorghe Munteanu (Universitatea "Ovidius" Constanța, Academia Forțelor Aeriene "Henri Coandă", Brașov)

Erlang Approximation on Pascal Convolution

In this paper it was shown that Pascal Convolution of independent, identically exponentially distributed r.v. is Erlang distributed r.v. Also it is shown that, in some conditions, Pascal Convolution of i.i.d.r.v. weakly converges to the Erlang distribution too.

18. Ilie Marinescu (Universitatea București)

A Chance Constrained Portfolio Problem with Weibull Fuzzy Distribution

We consider the selection problem of the rebalancing portfolio with chance constraints. The random variable of the chance constraints follows fuzzy Weibull distribution. We model these uncertainties using fuzzy numbers. The models are illustrated numerically and the examples of different models are compared. In

this paper, the chance constrained programming problem for the rebalancing problem of the portfolio has at first aim to minimize the transaction cost that has a certain limited risk. In Section 3. we reached a nonlinear problem and we succeeded helped by a programming package Excel to resolve this problem for a short time horizon and a two assets portfolio. We will buy an amount of 0.152 from the first asset and to sell the same amount of the second asset. The portfolio solutions will be 0.552 and 0.448 because the investor wants to make a profit after the rebalanced with a minimum transaction cost. From our example we observe a certain risk of the investor when he can make a profit. Even if we impose that the investor to make a minimum gain, the problem succeeds to find a better solution that the solution imposed by the decision maker. The Example 3. is a financial “trick” that optimizes the transaction cost by 0.02 percents smaller that the one described in the Example 1. but with a different form of the portfolio. This has the following component 0.11 and 0.89. The investor pays a lower cost on the transactions and with a brighter future.

19. Toni Mihalcea (Universitatea București)

Optimality conditions and duality in multiobjective optimization involving generalized type I functions

In this paper, we extend the notion of (F,a,q,d) -type I functions to second order and establish several mixed duality results under second order generalized (F,a,q,p,d) -type I functions. We use weaker convexity conditions to refine a second order sufficient optimality conditions.

20. Iulian Mircea, Mihaela Covrig (Academia de Studii Economice din București)

Some Approximations of Ruin Probability in a Risk Model

In this paper, we analyze the ruin probability for some risk models. The ideal situation is to be able to come up with closed form solutions for the infinite and finite time horizon ruin probability. But, the cases in which this is possible are few, therefore approximations of the ruin probability are appropriate. We focus on the diffusion approximations. The idea behind the diffusion approximation is to approximate first the claim surplus process by a Brownian motion with drift by matching the two first moments. Since Brownian motion is skip-free, the idea to replace the risk process by a Brownian motion ignores the presence of the overshoot and other things. Siegmund (1979) proposed a so-called “corrected diffusion approximation (CDA)” that reflects information in the increment distribution beyond the mean and variance. The objective of the corrected diffusion approximation is to take this and other deficits into consideration. The set-up is the exponential family of compound risk processes with parameters. Blanchet and Glynn (2005) developed this method to the full asymptotic expansion initiated by Siegmund. The first problem considered in Siegmund is to find the expected value of the maximum of a random walk with small, negative drift, and the second problem is to find the distribution of the same quantity. We analyze the ruin probability with respect to: the parameters of the individual claim distribution and the intensity parameter of the number of claims process

21. Romeo Negrea (Universitatea Politehnică Timișoara)

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

Our goal is to prove existence of solutions of a class of backward stochastic differential equation with some general assumptions on coefficients functions using a fixed point theorem. Also, we propose a method for numerical approximation of the solutions of backward stochastic differential equations in some non-lipschitz conditions for the coefficient functions and without the condition of the continuity for the final data. Given a simulation-based estimator of the conditional expectation operator, we then suggest a backward simulation scheme.

22. Valentin Pașilea (CREST)

Projection-based nonparametric goodness-of-fit testing with functional data

The problem of nonparametric testing for the effect of a random functional covariate on a real-valued or functional error term is studied. The functional variables take values in $L^2[0,1]$, the Hilbert space of the square-integrable real-valued functions on the unit interval. The error term could be directly observed as a response or estimated from a functional parametric model, like for instance the functional linear regression. Our test is based on the remark that checking the no-effect of the functional covariate is equivalent to checking the nullity of the conditional expectation of the error term given a sufficiently rich set of projections of the covariate. Such projections could be on elements of norm 1 from finite-dimension subspaces of $L^2[0,1]$. Next, the idea is to search a finite-dimension element of norm 1 that is, in some sense, the least favorable for the null hypothesis. Finally, it remains to perform a nonparametric check

of the nullity of the conditional expectation of the error term given the scalar product between the covariate and the selected least favorable direction. For such finite-dimension search and nonparametric check we use a kernel-based approach. As a result, our test statistic is a quadratic form based on univariate kernel smoothing and the asymptotic critical values are given by the standard normal law. The test is able to detect nonparametric alternatives, including the polynomial ones. The error term could present heteroscedasticity of unknown form. We do not require the law of the covariate X to be known. The test could be implemented quite easily and performs well in simulations and real data applications. We illustrate the performance of our test for checking the functional linear regression model.

23. Monica Patriche (Universitatea din București)

Equilibrium for multicriteria games in abstract convex spaces

In this paper we use the minimax inequalities obtained by S. Park (2011) to prove the existence of weighted Nash equilibria and Pareto Nash equilibria of a multicriteria game defined on abstract convex spaces.

24. Eugen Păltănea (Universitatea Transilvania din Brașov)

Recent advances in stochastic comparison of parametric families of distributions

We present a series of relevant recent results on stochastic comparison. We focus on the topic of order statistics from heterogeneous independent random variables whose distributions belong to a given parametric family. Different kinds of stochastic orders are discussed.

25. Udrea Păun (ISMMA)

Upper bounds for $P(X < k)$ and $P(X = k)$

Using the Markov chain method and certain results from the Markov chain theory, we give upper bounds for (a) $P(X < k)$ when X is a binomial random variable and when X is the longest success run in n independent trials; (b) $P(X = k)$ when X is the waiting time of a pattern L in the following cases (to illustrate our method): $L=ss\dots s$ of length l ; $L=ssff$; $L=ssUff$ (s -- success, f -- failure, $L=ssUff$ is a compound pattern).

26. Ciprian Popescu, Marius Giuclea (Academia de Studii Economice București)

On mathematical optimization

In this paper some optimization models and algorithms are discussed. Here are considered key features, strengths and weaknesses and different ways to approach. Some theoretical results are followed by numerical applications. The importance and the scope of the proposed algorithms are highlighted with emphasis on their use in economics.

27. Vasile Preda, Cristian Niculescu (Universitatea București)

Maximizing the generalized entropy with certain grade correlation coefficients

28. Marius Rădulescu (Institute of Mathematical Statistics and Applied Mathematics, Bucharest), Sorin Rădulescu, Constanța Zoie Rădulescu (National Institute for Research and Development in Informatics, Bucharest).

Mean-variance models with complementarity constraints

We extend Markowitz's portfolio selection model to include transaction costs in the presence of initial holdings for the investor. Our approach is new. Our aim is to obtain an optimal portfolio which has a minimum risk or a maximum return. Our portfolio selection models include complementarity constraints. This type of constraints increases the difficulty of the problems, which now enter in the category of combinatorial optimization problems. The set of feasible solutions for the problems from the above mentioned class is the union of a set of convex sets but it is no longer convex. We give an algorithm for finding the solution of portfolio selection models with complementarity constraints.

29. Alin Rusu (Universitatea din București)

On a Maxentropic Deformation of Entropy

Using the maximum entropy principle to obtain a trace from entropy, one yields a class of generalized logarithms from which Tsallis entropy is obtained. A general condition under which the Tsallis entropy becomes stable is presented.

30. Ioana Schiopu Kratina (Statistics Canada/University of Ottawa)

Optimizarea intersecției eșantioanelor selecționate în două anchete diferite

În această comunicare se prezintă succint problema maximizării și a minimizării intersecției ponderate a eșantioanelor selecționate în cadrul a două anchete statistice. Aceste anchete pot fi administrate fie simultan, fie consecutiv, iar unitățile eșantionale aparțin unei populații comune. Se subliniază importanța practică a obținerii unei soluții convenabile și se introduc metode de programare lineară care minimizează costul anchetelor și maximizează cooperarea unităților eșantionate. Metodele matematice utilizate combină metode de programare lineară cu metode statistice de minimizare a varianței erorilor și propun metode optime de selecție probabilistică a eșantioanelor.

31. Bogdan Sebacher (Universitatea Tehnică de Construcții București)

Complex geology estimation using EnKF. A probabilistic approach

In the past years, many applications of History Matching methods in general and Ensemble Kalman Filter in particular have been proposed, specially in order to estimate fields that provide uncertainty in the stochastically process defined by the dynamical system of hydrocarbons recovery. Such fields can be permeability fields or porosity fields, but as well can be the fields defined by the rock type (facies fields). The estimation of the boundaries of the geologic facies with EnKF was made, in different papers, with the aid of Gaussian Random Fields, which were truncated using various schemes, and introduced in a History Matching process. In this paper we estimate, in the frame of EnKF process, the locations of three

facies type that occur into a reservoir domain each two could have direct contact. The geological simulation model is a form of the general truncated plurigaussian method. The difference with other approaches consist on how the truncation scheme is introduced. First we will introduce a new object named "probabilities fields" through which we estimate the discrete fields defined by a facies type. This new object is defined as a projection of a Gaussian field in the [0,1] interval through a projection function. Each facies type will have associated a probabilities field and with a maximization criterion we define a facies map on the reservoir domain. From this geological simulation model arise a new truncation scheme (map), that will depends only on two parameters (defined in the truncation function) with which we control the facies proportions in the map. These two parameters are introduced in the EnKF process and estimated in order to obtain a better quantification of the expected facies proportions. In the EnKF framework we propose a new observation operator of the facies type in the grids with wells, operator that will offer us the probabilistic mark of the reality. Also with the EnKF method we estimate the probabilities fields of each facies type and applying them the maximization criterion we define a field named estimated field which will be the estimator of the truth field.

32. Popescu Sever-Angel (Universitatea Tehnică de Construcții București)

OREL Software: Learning and Knowledge Verification

The paper presents the interface between OREL, a special system for remote Operation Research learning, and students / visitors. Every electronic course, containing a sub-domain of Operation Research can be approached sequentially, module by module, navigating through its digital content: text / hypertext of lessons, multiple choice tests, problems / case studies, most frequently asked questions, real applications and bibliography. The

course is completed when passing a graduation exam, which can only be taken after passing the end-of-module exams.

33. Muhammad Sheraz (University of Bucharest)

On GARCH and Stochastic Volatility Modeling

GARCH processes are very famous in forecasting and modeling of financial data series. In recent research the stochastic volatility models have been used as an alternative to time dependent volatility of ARCH family. We compare the modeling of real financial data for GARCH family and stochastic volatility models. The models comparison is rooted on stylized facts generally and in particular on volatility clustering, asymmetric volatility or leverage effect. We consider skewed error distributions (heavy tailed) for both stochastic volatility models and GARCH family to generalize the Black-Scholes option pricing formula that assumes constant volatility. The models have been estimated by traditional estimation methods like maximum likelihood and further under Bayesian approach.

34. Mariana Sibiceanu (Institutul de Statistică Matematică și Matematică Aplicată, Academia Română)

Asymptotic exponential inequalities for empirical measures corresponding to distanced terms of a mixing sequence

Let $X : (X_n)_{n \geq 1}$ be a sequence of random variables on (Ω, K, P) with values in a topological space Σ , the subsequences $X^{(p)} : (X_n^{(p)})_{n \geq 1}$ $p \geq 1$, $X_n^{(p)} = X_{q_n^{(p)}}$ such that $q_{n+1}^{(p)} - q_n^{(p)} \geq a_p$ $\forall n \geq 1$, with $a_p \in N - \{0\}$, $a_p \uparrow \infty$, and the sequences of empirical measures $(L_n^{(p)})_{n \geq 1}$ of $X^{(p)}$, $p \geq 1$.

We characterize the limiting behavior of the sequence $\frac{1}{n} \log P(L_n^{(p)} \in A)$ as first n , then p tend to infinity, with A in the cylindrical σ - field on $M_1(\Sigma)$ generated by the family $\{\langle \varphi, \cdot \rangle, \varphi \in B(\Sigma)\}$, $B(\Sigma)$ - the space of bounded measurable real functions on Σ , when X is strictly stationary and verifies a certain strong mixing condition.

The two-parameter Large Deviation Principle for $(L_n^{(p)})_{n,p \geq 1}$ with scaling sequence $(n)_{n,p \geq 1}$ is established, when X is ψ mixing strictly stationary and Σ is a Polish space, also asymptotic exponential inequalities when X is ψ_+ mixing strictly stationary or at least φ mixing strictly stationary and Σ is a general topological space.

The statements reflect the ε almost K - wise independence structure of $X^{(p)}$, where K is arbitrarily large and p is large enough.

35. Diana-Elena Stanciu (Universitatea București)

On the continuity of the solutions set of a class of quasivariational inequalities

This paper investigates the continuity of the solutions set and approximate solutions set of a parametric quasivariational inequality of the Minty type. We also apply the results to a special optimization problem.

36. Andreea Mădălina Stancu, Ioan M. Stancu-Minasian (Institutul de Statistică Matematică și Matematică Aplicată al Academiei Române)

Duality in multiobjective subset programming problems involving generalized d-type I univex functions

We introduce new classes of generalized convex n-set functions. Sufficient optimality conditions are obtained under the assumptions of aforesaid functions. Duality results are also established for Mond-Weir and general Mond-Weir type dual problems in which the involved functions satisfy appropriate generalized d-type-I univexity conditions. Results obtained in this paper present a refinement and improvement of previously known results in the literature.

37. Ștefan Ștefănescu (Universitatea București)

Benini's model applied to analyze the income distributions

We studied the statistical properties of Benini two parameter distribution $Ben2(a,b)$. For evaluating the unknown values of the parameters a and b we proposed more estimators based on the method of moments, the median, the maximum likelihood principle, the Lorenz curve or on the order statistics. Some of these estimators were improved to become unbiased. Comparisons between the different estimation procedures are also made. The $Ben2(a,b)$ distribution could be used for modeling fire loss amount or to evaluate the characteristics of the income distribution for the rich individuals from a given population.

38. Aida Toma, Samuela Leoni-Aubin (ASE București și ISMMA, INSA Lyon, ICJ)

Minimum pseudodistance estimators of multivariate location and scatter and applications

In this paper we consider estimators of multivariate location and covariance obtained by pseudodistance minimization. Unlike other minimum divergence estimators, these estimators have the advantages of not requiring any prior smoothing and conciliate robustness with high efficiency, usually requiring distinct techniques. The minimum pseudodistance method has been introduced by Broniatowski et al. (2012) and consists in the minimization of an empirical version of a pseudodistance between the assumed model and the true model by using the empirical measure pertaining to the sample. The method can be applied to any parametric model, but in the present paper we focus on the multivariate normal model. The behavior of the estimators depends on a tuning positive constant. Depending on the choice of this constant, the estimators can afford considerable robustness at minimal loss of efficiency. Moreover, the estimators are affine-equivariant. We present these properties, empirical results, as well as an application to robust portfolio optimization. (Acknowledgements. This paper is supported 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).

39. Romică Trandafir, Daniel Ciuiu, Radu Drobot (Universitatea Tehnică de Construcții București, Romanian Institute of Economic Forecasting, Department of Hydrotechnic Engineering, Technical University of Civil Engineering, Bucharest)

Confidence Intervals in Hydrology Using Polynomial Regression

In this paper we will find the confidence intervals for the estimated volumes by linear regression in term of discharges. We will use the wellknown formula used in econometrics for the estimation of the variance of forecast, variance used for the confidence interval of forecast. In our case we use the mentioned formula in order to estimate the confidence interval for a future volume, if the discharge at that moment is given. Therefore we will estimate the volume as linear function on discharge (linear regression), and, using the estimation of the variance, the confidence interval for the estimated volume. Keywords: Linear regression, confidence interval, discharges, volumes. Aknowledgement: The authors are grateful to South East Europe (SEE) program which assured the funding for the Danube Floodrisk project.

40. Ciprian Tudor (Université de Lille 1)

Constantin Tudor: Contribuții în analiza stohastică

În această prezentare, voi trece în revistă contribuțiile Profesorului Constantin Tudor în domeniul teoriei probabilităților.

41. Mioara Varga (Universitatea de Științe Agronomice și Medicină Veterinară București)

A stochastic epidemic model with variable population size

After a short introduction in deterministic SIS and SIR models, we present three types of stochastic epidemic models: discrete times Markov chain (DTMC) model, continuous times Markov chain (CTMC) model and stochastic differential equation (SDE) model. We discuss an epidemic model with the variable population size, but one which varies according to some population growth law. Finally, we compare the stochastic differential equation of SIS epidemic model having constant population size with stochastic differential equation SIS having variable population size.

42. Ovidiu Vegheș (Academia de Studii Economice)

Continuity properties of a solution in cooperative games

43. Letiția Velcescu, Laurențiu Vasile (Universitatea din București, ISMMA)

Optimization of a set of database queries based on an estimation of the selectivity factor

In our work, we approached the database queries optimization problem using an estimation of the selectivity factor. We extended the concept of selectivity factor for a set of queries Q_1, \dots, Q_n , which are performed on the tables of a transactional database. In this case, the tables are supposed to be updated dynamically and, consequently, the selectivity factor associated to each query may vary in different moments. Because the selectivity factor has an important role in database optimization, it is necessary to be able to estimate it. In this

paper, we propose an algorithm for the estimation of the new concept of generalized selectivity factor, and also a hybrid estimator for it. Acknowledgement: This work was supported by the strategic grant POSDRU/89/1.5/S/58852, Project "Postdoctoral program for training scientific researchers" cofinanced by the European Social Found within the Sectorial Operational Program Human Resources Development 2007-2013.

44. Raluca Vernic and Elena Pelican (Universitatea Ovidius Constanța)

Statistical inference for the bivariate Sarmanov distribution: a real data study

The multivariate Sarmanov distribution has the advantage of being built from given marginals with a flexible dependency structure. Therefore, in this study we tried to fit several bivariate Sarmanov distributions with different marginals and structure kernels to a real data set from motor insurance, given that we previously studied the marginal distributions.

45. Claudia Zaharia, Dorel Miheț (Universitatea de Vest din Timișoara)

On the completeness of random normed spaces

By considering several concepts of boundedness in random normed spaces, we find suitable conditions under which the completeness of a RN-space is a consequence of the probabilistic stability for the additive Cauchy functional equation.

On negative dependence and portfolios

Two random variables negatively dependent if $E[f(X)g(Y)] \leq E[f(X)]E[g(Y)]$ for any increasing functions f and g . A random vector is pairwise negatively dependent if all its pairs components are negatively dependent. negative dependence implies negative correlation. We prove that if a vector is negatively dependent, then all risk-averse decision makers agree that diversification of portfolio is necessary, while that may not be true for negatively correlated one.

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