



**UNIVERSITATEA
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Facultatea de
Matematică și
Informatică



**UNIVERSITATEA
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Facultatea de
Matematică și
Informatică



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

A 12-a CONFERINȚĂ A SOCIETĂȚII DE PROBABILITĂȚI ȘI STATISTICĂ DIN ROMÂNIA

**Universitatea Ovidius Constanța
Facultatea de Matematică și Informatică
10 aprilie 2009**

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PROGRAMUL CONFERINȚEI SPSR 2009

Sectiuni:

- 1. Probabilități si Procese Stochastice**
- 2. Statistică**
- 3. Matematici Financiare si pentru Asigurări**
- 4. Optimizare**

Vineri 10 aprilie 2009

Sala E8

13:30 – 14:15 *Adunare generală a SPSR*

Ordinea de zi: raport financiar, diverse

14:15 – 14:30 Pauză

14:30 – 19:00 Comunicări pe secțiuni (E7, E8, E9)

19:30 Cină festivă

COMUNICĂRI PE SECȚIUNI

Vineri 10 aprilie

Sectia Probabilități si Procese Stochastice (Sala E8)

Conduce: Ioan Cuculescu

14:30 – 14:45: **Romeo NEGREA** (Universitatea "Politehnica" Timisoara)
On a class of nonlinear system under regime switching and stochastic perturbation

14:45 – 15:00 : **Dorel Miheț** (Universitatea "Politehnica" Timisoara)
The probabilistic stability of an additive functional equation

15:00 – 15:15: **Aurel Spătaru** (Institutul de Statistică Matematică și Matematică Aplicată)
The law of the iterated logarithm for finitely inhomogeneous random walks

15:15 – 15:30 : **Constantin Tudor, Maria Tudor** (Universitatea Bucuresti, ASE Bucuresti)
Some limit theorems for a class of diffusion processes with non smooth coefficients

15:30 - 16:00 – Pauză

Conduce: Constantin Tudor

16 :00 – 16:15: **Mioara Buiculescu** (Institutul de Statistică Matematică și Matematică Aplicată)
Exponential decay for a class of Feller processes

16:15 - 16:30 : **Ana Raducan** (Institutul de Statistica Matematica si Matematica Aplicata)
Problema lui Dugue in cazul discret

16 :30 – 16 :45 : **Dan Lascu, Ion Coltescu** (Academia Navala "Mircea cel Batran", Constanta)

Metrical theory of a generalized continued fraction expansion

16:45 – 17:00 **Carmina Georgescu** (University Politehnica of Bucharest)
An existence result for stochastic neutral functional integrodifferential inclusions

17:00 – 17:30 - Pauză

Conduce: Mioara Buiculescu

17:30 – 17:45: Gheorghită Zbăganu (Universitatea București)

Randomness increasing mappings and operations

17:45 – 18:00 : Popoviciu Ioan (Academia Navala "Mircea cel Batran" Constanta)

Discretization models for Poisson equation with Dirichlet boundary conditions

18:00 – 18:15: Rusu Alin Marian (Universitatea Bucuresti)

Some Relations Between the Maximum Entropy Principle and the Principle of Least Effort

18:15 – 18:30 : Clim Adriana Nicoleta (Universitatea Bucuresti)

Some higher optimal approximations of divergence

18:30 – 18:45 Sandra Teodorescu si Raluca Vernic (Universitatea Ecologica din Bucuresti ; Universitatea "Ovidius" din Constanta)

On composite Pareto models

Sectia Statistică (Sala E7)

Conduce: Ștefan Ștefănescu

14:30 – 14:45: Daniel Ciuiu (Universitatea Tehnica de Constructii, Bucuresti)

Informational Criteria for the Homoscedasticity of the Errors

14:45 – 15:00 : Voicu Boscaiu (Institute of Mathematical Statistics and Applied Mathematic)

15:00 – 15:15: Dumitrescu M, Sarlea S, Cidota M (Universitatea Bucuresti, Institutul de Biochimie)

A logistic-hidden Markov model of cell signaling for insulin release

15:15 – 15:30 : Sorin Demetriu, Romică Trandafir (Universitatea Tehnică de Construcții București)

Distributii de energie ale miscarilor seismice simulate

15:30 - 16:00 – Pauză

Conduce: Monica Dumitrescu

16 :00 – 16:15: **Tiberiu Postelnicu** (Institutul de Statistica Matematica si Matematica Aplicata)

Bayesian Inference for Case-Control Studies

16:15 - 16:30 : **Romica Trandafir, Cornel Resteanu, Sorin Demetriu**
(Universitatea Tehnica de Constructii Bucuresti, Institutul National de Cercetare Dezvoltare)

Algorithm for Processing E-Business in Metallurgy of Iron Plants

16 :30 – 16 :45 – **Luiza Badin, Cinzia Daraio, Leopold Simar** (Bucharest Academy of Economic Studies, University of Bologna, Universite Catholique de Louvain)

Optimal Bandwidth Selection for Conditional Efficiency Measures: a Data-driven Approach

16:45 – 17:00 **Aida Toma** (Academia de Studii Economice)

Robust Saddlepoint Test Statistics based on Divergence Optimization

17:00 – 17:30 – pauză

Conduce: Romică Trandafir

17:30 – 17:45 - **State Mihaela** (Universitatea Stefan cel Mare)

Analiza statistica a resurselor de munca din județul Suceava

17:45 – 18:00 : **Nina Stanciu** (Academia Romana)

Inferenta statistica in cazul distributiei Poisson

18:00 – 18:15: **Stefan Stefanescu** (Universitatea Bucuresti)

An estimation for the area of a triangular domain

18:15 – 18:30 : **Iuliana Iatan** (Universitatea Tehnica de Constructii Bucuresti)

The Expectation- Maximization Algorithm: Gaussian Case

18:30 – 18:45 : **Cornelia Enachescu, Denis Enachescu** (Institutul de Statistica Matematica si Matematica Aplicata, Universitatea Bucuresti)

Studiul comparativ al metodelor de detectare a valorilor aberante pentru studii de bioechivalenta

18.45 – 19:00 - A. Amarioarei, Iulia Stanciu, Manuela Sidoroff
(National Institute of Research and Development for Biological Sciences, Bucharest), V. Boşcaiu (ISMMA)
Analiza cluster a variabilității coabitării speciilor alpine

Sectia Matematici financiare și Optimizări (Sala E9)

Conduce: Alexei Leahu

14:30 – 14:45: Roxana Ciumara, Vasile Preda (ASE Bucuresti, Universitatea din Bucuresti)

A new mixed distribution in lifetime analysis

14:45 – 15:00 : Mihaela Covrig (Academia de Studii Economice din Bucuresti)

Some applications of sums of random variables in non-life insurance

15:00 – 15:15: Iulian Mircea (Academia de Studii Economice din Bucuresti)

On some methods in estimating the ruin probability

15:15 – 15:30 : Raluca Vernic, Sandra Teodorescu (Ovidius University of Constanta; Ecological University of Bucharest)

LogNormal mixture models with insurance applications

15:30 - 16:00 – Pauză

Conduce: Raluca Vernic

16 :00 – 16:15: Carmen Elena Lupu (Universitatea "Ovidius" Constanta)

On the binomially mixed exponential lifetime distributions

16:15 - 16:30 : Eugenia Panaitescu (Universitatea de Medicina si Farmacie "Carol Davila")

Satisfying decisions in multi-agent systems

16 :30 – 16 :45 – Horia Oprica (Universitatea Politenica Bucuresti)

Studiu critic asupra cotațiilor la bursa

16:45 – 17:00 Ion Mierlus Mazilu (Universitatea Tehnica de Constructii Bucuresti)

Risk with positive outcomes

17:00 – 17:30 – pauză

Conduce: Vasile Preda

17:30 – 17:45 - **A. Bătătorescu, I. Antonescu, M. Beldiman** (Universitatea din București, Academia Navală "Mircea cel Batrân", Institutul de Statistica Matematica si Matematica Aplicata)

Second-order duality for a class of nondifferentiable programming problems

17:45 – 18:00 : **I. M. Stancu-Minasian, Andreea Madalina Stancu** (Institutul de Statistica Matematica si Matematica Aplicata)

Duality in multiobjective subset programming involving generalized type-I functions

18:00 – 18:15: **Gheorghe Dogaru** (Academia Navala "Mircea cel Batran", Constanta)

A stochastic programming mathematical model for the ship allocation problem

18:15 – 18:30 : **Toni Mihalcea** (Universitatea Bucuresti)

Second order necessary conditions of the Kuhn-Tucker type under new constraint qualifications

18:30 – 18:45 – **Alina Paraschiv** (Institutul de Statistica Matematica si Matematica Aplicata)

On global semiparametric sufficient efficiency conditions in multiobjective fractional programming with generalized $(F, b, \phi, \rho, \theta)$ -univex n -set functions

REZUMATELE COMUNICARILOR

Analiza cluster a variabilității coabitării speciilor alpine

A. Amarioarei, Iulia Stanciu, Manuela Sidoroff ¹⁾, V. Boșcaiu²⁾
vboscaiu@gmail.com

¹⁾ National Institute of Research and Development for Biological Sciences, Bucharest

²⁾ “Gheorghe Mihoc-Caius Iacob” Institute of Mathematical Statistics and Applied Mathematics, Bucharest

Pornind de la un set de date empirice (matrici “prezență-absență”, date geografice și date meteorologice), se studiază dependența între coabitarea speciilor de vegetație alpină și factorii geografici și microclimatici locali. Se utilizează modele de analiză cluster dependentă de variabile exogene.

Second-order duality for a class of nondifferentiable programming problems

A. Bătătorescu, I. Antonescu, M. Beldiman (Universitatea din București, Academia Navală "Mircea cel Batrân", I.S.M.M.A.)
batator@fmi.unibuc.ro

We establish necessary and sufficient optimality conditions for a class of programming problems with square-root terms in the objective function. Subsequently, we apply the optimality conditions to formulate a parametric dual problem and we prove some duality theorems. We also consider an extension to a higher order duality.

Robust Saddlepoint Test Statistics based on Divergence Optimization

Aida Toma (Academia de Studii Economice)
aida_toma@yahoo.com

The nonrobustness of classical estimators and tests for parametric models is a well-known problem and robust alternative methods have been proposed in literature. Usually, the robust methods are based on first order asymptotic theory and their accuracy in small samples is often an open question. In this paper, we propose test statistics that have both robustness properties and good accuracy in small samples. We combine robust dual divergence estimators and saddlepoint approximations and obtain robust test statistics which are asymptotically chi-square distributed with a relative error of order $O(1/n)$.

On global semiparametric sufficient efficiency conditions in multiobjective fractional programming with generalized $(F, b, \phi, \rho, \theta)$ -univex n -set functions

Alina Paraschiv (Institutul de Statistica si Matematica Aplicata)
alinaparaschiv@yahoo.com

We consider some types of generalized convexity and discuss semiparametric sufficient efficiency conditions for a multiobjective fractional programming problem involving n -set functions.

Problema lui Dugue in cazul discret

Ana Raducan (Institutul de Statistica si Matematica Aplicata)
anaraducan@yahoo.ca

Problema lui Dugue cere determinarea variabilelor aleatoare independente X, Y care au proprietatea că există o constantă $c \in (0; 1)$ astfel încât $\phi_{X+Y} = \phi_X + (1 - c) \phi_Y$, unde cu ϕ_X am notat funcția

caracteristică a variabilei X . Prezentăm o soluție a acestei probleme în cazul în care X , Y sunt discrete.

The law of the iterated logarithm for finitely inhomogeneous random walks

Aurel Spătaru (Institutul de Statistică Matematică și Matematică Aplicată)

aspatary@rdslink.ro

The term finitely inhomogeneous random walk designates a sequence of sums $S_n = X_1 + \dots + X_n$, $n \in \mathbb{N}$, where the steps X_n , $n \in \mathbb{N}$, are independent random variables having a finite number of possible distributions. Several classical results concerning i.i.d. X_n , such as the Marcinkiewicz-Zygmund strong law of large numbers or the Lindeberg-Feller central limit theorem, generalize easily to the new set-up. However, the attempt to get other generalizations proved to be difficult. The purpose of this work is to extend the Hartman-Wintner-Strassen law of the iterated logarithm to finitely inhomogeneous random walks.

On the binomially mixed exponential lifetime distributions

Carmen Elena Lupu (Universitatea "Ovidius" Constanta)

clupu@univ-ovidius.ro

In this paper we consider binomially mixed exponential distribution. Properties and some characteristics of resulting distribution as a survival model was described. Key words: survival model, life time distribution, reliability.

An existence result for stochastic neutral functional integrodifferential inclusions

Carmina Georgescu (University Politehnica of Bucharest)

carmina_amd@yahoo.com

Some limit theorems for a class of diffusion processes with non smooth coefficients

C. Tudor, M. Tudor (Universitatea Bucuresti, ASE Bucuresti)
ctudor@fmi.unibuc.ro

We study functional asymptotic behavior of p -trace processes of some matrix valued stochastic processes

The sequence of measure-valued processes

$$\mu_t^{(n)} = \frac{1}{n} \sum_{j=1}^n \delta_{\lambda_j^{(n)}(t)}, \quad t \geq 0,$$

where δ_x is the unit mass at x and $\{\lambda_j^{(n)}(t)\}_{t \geq 0}$ is the multidimensional process of eigenvalues of the corresponding processes, converges weakly to a family of deterministic laws.

For each $p \geq 1$ we establish uniform almost surely and L^p -laws of large numbers and study the almost surely convergence of the supremum (resp. infimum) over compact intervals of the largest (resp. smallest) eigenvalue processes.

The weak convergence of the fluctuations around the limit to one-dimensional centered Gaussian processes is also proved.

Our approach is based on stochastic analysis and semimartingale tools..

Some higher optimal approximations of divergence

Clim Adriana Nicoleta (Univ. Bucuresti)
nicoleady@yahoo.com

Here are presented some optimal estimates of the proper distance of two probability measures in weighted case. We started from the most important and general tool for their comparison, like Csiszar's f divergence between probability measures. Based on Taylor's formula, we extend some known representations of Csiszar's distance and we estimate their remainders in many directions, using the modulus of continuity way.

Metrical theory of a generalized continued fraction expansion

Dan Lascu si Ion Coltescu (Academia Navala "Mircea cel Batran", Constanta)

lascudan@gmail.com, icoltescu@yahoo.com

The purpose of this paper is to present the metrical theory of a new continued fraction expansion. The existence of such expansions was proved by the same authors in a paper from 2007. Now, we present and proof a formula which allows us to determine the probability structure of the incomplete quotients under the Lebesgue measure.

Informational Criteria for the Homoscedasticity of the Errors

Daniel Ciuiu (Universitatea Tehnica de Constructii, Bucuresti)

dciuiu@yahoo.com

In this paper we will test the homoscedasticity of the errors using the Goldfeld–Quandt test and we will classify the points using the explanatory variable on which we sort them. We will also use the Hartley test for the equality of the classes errors' variances (if we have at least two classes). For all the points (only one class) and all the possible classifications for which we have homoscedasticity we will compute some informational crireria like Akaike (AIC=Akaike Informational Criterion) and Schwartz (BIC=Bayes Informational

Criterion). Of course, from these classifications we will choose that classification with the minimum of the considered criterion.

As application we have mounthly data fom November 1990 till November 2008 concerning the prices' indexes for services, the prices' indexes for food goods and the prices' indexes for non-food goods.

A LOGISTIC - HIDDEN MARKOV MODEL OF CELL SIGNALING FOR INSULIN RELEASE

Dumitrescu M, Sarlea S, Cidota M (Universitatea Bucuresti, Institutul de Biochimie)

mdumi@fmi.unibuc.ro, steliansarlea@yahoo.com, marina_cidota@yahoo.com

The issue of cell signaling to induce insulin release is addressed by means of a complex approach, considering the associated biophysical and biochemical mechanisms and proposing a new stochastic model for the voltage channel. Glycaemia level and the level of intracellular calcium represent an important element of oxidative stress for the pancreatic cell. The excess of glucose is autooxidated in the pancreatic cell and this produces reactive oxygen species, which generate oxidative stress. By adding unsaturated fat acid - as "incentive" of kinases which activate the enzymes, one can support cell signaling to induce antioxidant defenses and to help insulin to be released. Thus, addition of an appropriate quantity of oleic acid would influence the quality of cell signaling.

The direct observation of the voltage channel is not possible. But, as a result of cell signaling, a "cell repairing process" occurs - in terms of using protein kinase C (PKC) for antioxidant defenses. The amount of "free" PKC (after cell "repairing") can be experimentally assessed. Also, the intracellular Calcium can be assessed.

A stochastic model for an experimental input - output relationship in cell signaling for insulin release is proposed. The model we discuss takes advantage of the previous experience of modeling single ion channel activity by means of a Hidden Markov Model (HMM) (Venkataramanan and Sigworth, 2002). Instead of a HMM with two states, a model with three states is introduced (the states "open" / "intermediate" / "closed") The added oleic acid is considered as a covariate in a Logistic Model (LM) for the parameters of the HMM. The output variable is the level of "free" PKC (possibly, the level of intracellular Calcium too).

An experimental design is implemented. A support of connected pancreatic cells is generated, under proper environmental conditions ("healthy cells"). A sample of connected "healthy cells" is drawn and the "standard" levels of free PKC are assessed. The support of connected pancreatic cells is placed into different environmental conditions: an

amount y of oleic acid is added, and the glucose level is raised up to the "first level" g_1 . A new sample of connected cells is drawn and the corresponding level of free PKC is assessed. The procedure is repeated for several glucose levels, up to a diabetes coma. Thus, the input variables are glucose levels and the amounts of added oleic acid, and the output variables are the levels of free PKC.

Parameter learning is achieved by means of the Maximum Likelihood method. An adapted Baum - Welch Algorithm is constructed and the iterative estimators of the parameters of the considered Logistic HMM are obtained in closed forms. The procedures are implemented by using appropriate functions of MATLAB.

Studiul comparativ al metodelor de detectare a valorilor aberante pentru studii de bioechivalenta

Cornelia Enachescu, Denis Enachescu (ISMMA)

Lucrarea isi propune sa studieze o serie de proceduri bazate pe teste statistice care sa verifice existenta valorilor aberante in studiile de biodisponibilitate, sa introduca metode de vizualizare si de analiza a datelor, care prezinta avantajul unei interpretari facile a rezultatelor si sa compare rezultatele obtinute în urma aplicarii acestor tehnici.

SATISFICING DECISIONS IN MULTI-AGENT SYSTEMS

Eugenia Panaitescu (Universitatea de Medicina si Farmacie "Carol Davila")

e.panaitescu@yahoo.com

An essential feature of intelligence is the ability to make autonomous choices. A new paradigm of satisficing decision making incorporates many utilities for decision making, rather than the usual single utility that is characteristic of optimal decision making. Satisficing theory is an alternative approach that is compatible with the limited rationality associated with multi-agent systems. In this paper, this theory is extended at multi-agent systems by the introduction of the functions that generalizes

results given by M. A. Goodrich, W. C. Stirling, and R. Frost (1998) to provide a systematic procedure for the design of satisficing actions.

A stochastic programming mathematical model for the ship allocation problem

Gheorghe Dogaru (Academia Navala "Mircea cel Batran", Constanta)

gheorghe_dogaru@yahoo.com

This paper presents a mathematical model for the optimization of the activity of a single ship or an entire naval fleet with respect to the transport of various types of goods and resource management, when the demand and offer are not deterministic, but rather random.

Randomness increasing mappings and operations

Gheorghita Zbaganu (Universitatea Bucuresti)

zbaganu@fmi.unibuc.ro

There are at least two ways to measure the randomness: variance $\text{Var}(X)$ and variation coefficient $c(X)$. We say that a mapping f is randomness increasing if $c(f(X)) \geq c(X)$ and study for what type of functions this condition holds. In the same way we define the randomness-increasing operations. For instance the multiplication increases the randomness but the addition decreases it.

Studiu critic asupra cotațiilor la bursa

Horia Oprica (Universitatea Politehnica Bucuresti)

[hoprica@yahoo.com](mailto:hoprca@yahoo.com)

Se prezinta elemente de analiza fundamentala si tehnica a pietei; se arata ca s-a exagerat pe variantele produselor derivate; in alegerea optiunilor analizele de tip VAN s-au dovedit simpliste. Se considera necesara aplicarea legii entropiei in procesele economice, teorie in care contributia lui Georgescu-Roegen a fost primordiala.

Duality in multiobjective subset programming involving generalized type-I functions

I. M. Stancu-Minasian, Andreea Madalina Stancu (Academia Romana)

stancu_minasian@yahoo.com, andreea madalina_s@yahoo.com

In this paper, we establish some duality results for a multiobjective subset programming problem under generalized (F, α , ρ , d)-type I functions.

Risk with positive outcomes

Ion Mierlus Mazilu (Universitatea Tehnica de Constructii Bucuresti)

mmi@mail.utcb.ro

In this paper we present a relative risk-value model and derive a relative measure of risk with positive outcomes. Under a condition called relative risk independence, a decision could be made by explicitly trading off between the relative measure of risk and a measure of value, which can either be consistent with some expected utility models or represent nonexpected utility preferences.

On some methods in estimating the ruin probability

Iulian Mircea (Academia de Studii Economice din Bucuresti)

mirceaiulian91@yahoo.com

The evolution of the money capital of an insurance company can be mathematically modeled by a stochastic process

$$S = \left\{ S(t) = \sum_{i=1}^{N(t)} X_i, t \geq 0 \right\}, \text{ where } N = \{N(t), t \geq 0\} \text{ is the stochastic}$$

process of the number of claims, and $\{X_i\}_{i=1,2,\dots}$ is the sequence of positive random variables describing the individual claims or losses. The risk process $U = \{U(t) = G(t) - S(t), t \geq 0\}$, $G(t)$ being the net average income resulted from the cashed premiums up to moment t . We are interested in estimating the ruin probability, that is the probability that $U(t) + r < 0$, where r stands for the initial reserve of the insurance company. In this paper we study the behavior of some methods which approximate this probability, in certain hypotheses on the risk process.

The Expectation- Maximization Algorithm: Gaussian Case

Iuliana Iatan (Universitatea Tehnica de Constructii Bucuresti)
iuliafi@yahoo.com

There are some situations when in the pattern recognition applications can appear some objects which are missing data. This thing one happens since the process of data acquisition isn't perfect. In this paper we shall present the EM algorithm (Expectation- Maximization) which is used in order to estimate the parameters corresponding to a probability density function when we dispose by missing data. In our case, the class labels are the missing data.

Optimal Bandwidth Selection for Conditional Efficiency Measures: a Data-driven Approach

Luiza Badin, Cinzia Daraio, Leopold Simar (Bucharest Academy of Economic Studies, University of Bologna, Universite Catholique de Louvain)
luizab@ase.ro

In productivity analysis an important issue is to detect how external (environmental) factors might influence the production process and the resulting efficiency of the firms. Most of the traditional approaches proposed in the literature have serious drawbacks. An alternative approach is to describe the production process as being conditioned by a given value

of the environmental variables (Cazals, Florens and Simar, 2002, Daraio and Simar, 2005). This defines conditional efficiency measures where the production set in the input $\times$ output space may depend on the value of the external variables. The statistical properties of nonparametric estimators of these conditional measures are now established (Jeong, Park and Simar, 2008). These involve the estimation of a nonstandard conditional distribution function which requires the specification of a smoothing parameter (a bandwidth). So far, only the asymptotic optimal order of this bandwidth has been established. This is of little interest for the practitioner. In this paper we fill this gap and we propose a data-driven technique for selecting this parameter in practice. The approach, based on a Least Squares Cross Validation procedure (LSCV), provides an optimal bandwidth that minimizes an appropriate (weighted) integrated Squared Error (ISE). The method is carefully described and exemplified with some simulated data with univariate and multivariate environmental factors. An application on real data (performances of US Mutual Funds) illustrates how this new optimal method of bandwidth selection works in practice.

Some applications of sums of random variables in non-life insurance

Mihaela Covrig (Academia de Studii Economice din Bucuresti)
mihaelacovrig@gmail.com

In the non-life insurance business, an actuary faces the problem of determining the distribution function of a sum of random variables which are not necessarily independent, like aggregate claims of an insurance portfolio, or the accumulated fund at the end of an extended period of time, or the present value of a sequence of payments. The paper points out some applications of approximating such sums when the individual distribution functions of the terms are known, but their dependence unknown.

The probabilistic stability of an additive functional equation

Mihet Dorel (Universitatea "Politehnica" Timisoara)

mihet@math.uvt.ro

Let m be a positive rational number. We instigate the Hyers-Ulam - Rassias stability for the equation $f(m(x+y))=m(f(x)+f(y))$ where the unknown f is a mapping from a real linear space X to a Menger probabilistic ϕ -normed space Y . Joint paper with I. Gole.

Exponential decay for a class of Feller processes

Mioara Buiculescu (ISMMA)

mioara_buiculescu@yahoo.com

We consider irreducible Feller processes satisfying $\sup_{x \in E} P^x (\exp (\gamma \zeta)) < \infty$ for some $\gamma > 0$, E being the state space, $(P^x)_{x \in E}$ the probabilities generated by the semigroup of the process and ζ the corresponding life time.

First we show that the exponential decay parameter λ of the process coincides with λ_0 , the spectral radius of the semigroup on the Banach space of bounded measurable functions and that the process is λ_0 -positive recurrent.

Next we obtain asymptotic results of large deviations type and discuss properties of the corresponding rate function.

The same problems were previously considered by the author for strong Feller processes.

Inferenta statistica in cazul distributiei Poisson

Nina Stanciu (Academia Romana)

roninachi@yahoo.com

Acest articol foloseste functiile de probabilitate si ML (maximum likelihood), parametrul ce maximizeaza aceasta functie, pentru a realiza inferenta in cazul distributiilor de tip Poisson si Poisson multinomiala.

Presupunand ca avem date cu o distributie de tip Poisson, am aratat ca parametrul ce maximizeaza functia de probabilitate este chiar media si ca aceasta si varianta unei variabile aleatoare sunt aproximativ egale.

Pentru a testa ipoteza nula am folosit pe rand metoda Wald, metoda scorurilor si metoda likelihood-ratio si am determinat intervalul de incredere al parametrului pentru fiecare metoda prezentata.

De asemenea, am determinat estimatorii ML in cazul parametrilor Poisson multinomiali si am prezentat testul Pearson si testul G^2 , cel care foloseste likelihood-ratio.

Discretization models for Poisson equation with Dirichlet boundary conditions

Popoviciu Ioan (Academia Navala "Mircea cel Batran"
Constanta)
bhbro@yahoo.com

We combine a compact high-order difference approximation with multigrid V-cycle algorithm to solve the two dimensional Poisson equation with Dirichlet boundary conditions. This scheme, along with several different orderings of grid space and projection operators, is compared with the five-point formula.

LogNormal mixture models with insurance applications

Raluca Vernic and Sandra Teodorescu (Ovidius University of
Constanta; Ecological University of Bucharest)
rvernic@univ-ovidius.ro; cezarina_teodorescu@yahoo.com

Based on the statistical analysis of a data sample from property insurance, in this paper we consider two lognormal mixture models that we fitted to our data sample. The first model is a usual two components lognormal mixture for which we used the EM algorithm to estimate the parameters. The second one, called a composite lognormal-lognormal model, can in fact be reduced to a particular two components mixture model having truncated lognormals as mixture distributions. This composite model is studied in some detail and we present some specific parameters estimation methods. We also discuss and compare both models fit to the data.

On a class of nonlinear system under regime switching and stochastic perturbation

Romeo NEGREA (Universitatea "Politehnica" Timisoara)
negrea@math.uvt.ro

In this paper we study a nonlinear system under regime switching and subject to an environmental noise. We will considered some more general conditions for the coefficient functions and prove a result on the existence and the pathwise uniqueness and some stability properties. Also, we present some engineering applications of these equations.

Distributed and parallel computing for processing e-business in metallurgy of iron plants

Romica Trandafir, Cornel Resteanu, Sorin Demetriu
(Universitatea Tehnica de Constructii Bucuresti, Institutul
National de Cercetare Dezvoltare, Universitatea Tehnica de
Constructii Bucuresti)
romica@utcb.ro, resteanu@ici.ro, demetriu@yahoo.com

In order to extend worldwide the processing business of the metallurgy of iron plant, ICI Bucharest has developed the software named Tele-PROCESSING II. This is an informatics support, working via Internet, for negotiations between the metallurgy of iron plant and its business partners. The core of the negotiations process, from technical and mathematical point of view is a multi-objective linear programming model with a large number of divergent goals under attention. The solving method, by distributed and parallel computing, for multi-objective linear programming model with a large number of objective functions, is the strong point of this paper. In order to extend worldwide the processing business of the metallurgy of iron plant, ICI Bucharest has developed the software named Tele-PROCESSING II. This is an informatics support, working via Internet, for negotiations between the metallurgy of iron plant and its business partners. The core of the negotiations process, from technical and mathematical point of view is a multi-objective linear programming model with a large number

of divergent goals under attention. The solving method, by distributed and parallel computing, for multi-objective linear programming model with a large number of objective functions, is the strong point of this paper.

A new mixed distribution in lifetime analysis

Roxana Ciumara, Vasile Preda (ASE Bucuresti, Universitatea din Bucuresti)

roxana_ciumara@yahoo.com

The study of lifetime and residual lifetime distribution play a central role in life insurance mathematics, and moreover they could be applied in the biological and engineering sciences. Therefore, we propose here a new lifetime distribution, obtained by mixing Weibull and logarithmic distributions. After deriving the most important features of our mixed distribution, we consider the problem of estimating uncertainty in the residual lifetime, applying different types of measures in this respect, such as hazard, mean residual lifetime or Shannon information measures. Furthermore, we find conditions for the existence and uniqueness of MLE estimates of the parameters of this distribution.

Some Relations Between the Maximum Entropy Principle and the Principle of Least Effort

Rusu Alin Marian (Universitatea Bucuresti)

rusualinmarian@yahoo.com

The principle of maximum entropy (PME) maximizes the weighted entropy subject to the constraint that the weighted effort remains constant. This principle of least effort (PLE) minimizes the weighted effort subject to the constraint that the weighted entropy remains constant. We shall state some relations between these two principles.

On composite Pareto models

Sandra Teodorescu si Raluca Vernic (Universitatea Ecologica din Bucuresti ; Universitatea "Ovidius" din Constanta)

cezarina_teodorescu@yahoo.com; rvernic@univ-ovidius.ro

To model statistical data coming from two different distributions, Cooray and Ananda (2005) introduced a composite Lognormal-Pareto model, that was further developed by Scollnik (2007). In this paper, we consider a more general Pareto model, obtained by replacing the Lognormal distribution with an arbitrary continuous distribution. The main characteristics of this model, as well as some statistical inference are presented. The particular cases of the composite Gamma-Pareto and Weibull-Pareto models are detailed and numerically illustrated.

Distribuții de energie ale mișcărilor seismice simulate

Sorin Demetriu, Romică Trandafir (Universitatea Tehnică de Construcții București)

demetriu@utcb.ro, romica@utcb.ro

Acelerogramele naturale/artificiale și spectrele de răspuns sunt reprezentări ale acțiunii seismice pentru proiectare, esențiale în calculul răspunsului dinamic al structurilor și în evaluarea performanțelor de comportare ale unor construcții în timpul unor evenimente seismice severe. Înregistrările componentelor de translație ale accelerației mișcării terenului generate de cutremurele puternice sunt caracterizate de nestăționaritatea conținutului de energie și compoziției spectrale. În lucrare sunt considerate distribuții neparametrice comune pentru caracterizarea evolutivă a energiei accelerogramelor în domeniul bidimensional timp-frecvență. Semnalele seismice analizate sunt accelerograme simulate compatibile cu spectre de proiectare specificate de normele europene.

Analiza statistica a resurselor de munca din județul Suceava

State Mihaela (Universitatea Stefan cel Mare)

s_mihaela79@yahoo.com

An estimation for the area of a triangular domain

Stefan Stefanescu (Universitatea Bucuresti)

stefanst@fmi.unibuc.ro

Knowing n random points inside a triangular domain we will estimate the area of this region. A Monte Carlo approach is used to evaluate the accuracy of the proposed estimation procedure.

Bayesian Inference for Case-Control Studies

Tiberiu Postelnicu (ISMMA)

tposteln15@yahoo.com

The aim of this paper is to present some new aspects regarding statistical methods for case-control studies. Identification of factor that increase the chances of a certain disease is one of the classical and central issues in epidemiology. In this context, the odds-ratio, as typical measure of association between disease and risk factor is presented for matched studies, as well as using Bayesian inference. The use of complex stratified sampling procedures and of the meta-analysis are discussed.

Second order necessary conditions of the Kuhn-Tucker type under new constraint qualifications

Toni Mihalcea (Universitatea Bucuresti)

toni_mihalcea@yahoo.com

In this paper, I develop nonlinear programming problem with equality and inequality constraints. I studied the second order necessary conditions of the Kuhn-Tucker type and prove that the conditions hold under new constraint qualifications.

On clustering validation

Voicu Boscaiu

vboscaiu@gmail.com

“Gheorghe Mihoc-Caius Iacob” Institute of Mathematical Statistics and Applied Mathematics, Bucharest

An intensively used tool for biological sciences is clustering. A common simple structure of involved input data is a matrix: rows could be samples, sites, individuals or experiments; columns could be genes, species, diseases, risk factors, lab determination, etc; entries are presence-absence values (0-1) or some measured lab values. Often, the number of columns could be quite large, by far from the number of rows.

Some general questions about clustering accuracy arise.

Irrespective on the supplementary knowledge about samples (if any) and hypothetical “empirical nice results”, we must be able to validate obtained clusters. We must answer some theoretical questions concerning: 1) the effect of including some useless columns; 2) the case of large number of columns and moderate number of rows; 3) effect of mixing (by mistake!) two groups of samples, each group having a well-correlated group of variables.

The literature of the field is extremely rich. Some theoretical and simulation results will be mentioned.