

The semi-linear credibility model

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Abstract: Semi-linear credibility estimators are linear functions of transformed observations. The estimators mainly considered here are linear functions of several functions $f_p, p = \overline{1, n}$ of the observable random variables. Instead of considering linear combinations of the observable variables themselves $X_r, r = \overline{1, t}$ one could consider as estimators the class of linear combinations of given functions of the observable variables $f_p(X_r), p = \overline{1, n}, r = \overline{1, t}$. Our problem is the determination of the linear combination of 1 and the random variables $f_p(X_r), p = \overline{1, n}, r = \overline{1, t}$ closest to $\mu_0(\theta) = E[f_0(X_{t+1})|\theta]$ in the least squares sense, where θ is the structure variable. The solution of this problem:

$$\text{Min}_{\alpha_0, \alpha} E \left\{ \left[\mu_0(\theta) - \alpha_0 - \sum_{p=1}^n \sum_{r=1}^t f_p(X_r) \right]^2 \right\}, \text{ where } \alpha = (\alpha_{p,r})_{p,r} \text{ is the}$$

optimal non-homogeneous linearized estimator (namely the semi-linear credibility result). It turns out that this procedure does not provide us with a statistic computable from the observations, since the result involves unknown parameters of the structure function. To obtain estimate for these structure parameters a_{pq}, b_{pq} , for the semi-linear credibility model we embed the contract in a collective of contracts, all providing independent information on the structure distribution. The usefulness of the approximation (to $f_0(X_{t+1})$ or to $\mu_0(\theta)$) based on prescribed approximating functions $f_p, p = \overline{1, n}$ is

3that it is easy to apply, since it is sufficient to know estimates for the parameters a_{pq}, b_{pq} appearing in the credibility factors z_p .

Optimality Conditions and Duality Results for a Minimax Nondifferentiable Programming Problem, Involving (η, ρ, θ) -Invex Functions

Anton BĂȚĂTORESCU, Iulian ANTONESCU (Universitatea din București, Academia Navală "Mircea cel Bătrân")

We establish necessary and sufficient optimality condition, involving (η, ρ, θ) -invex functions, for a class of minimax programming problems with a square-root term in the objective function. Subsequently, we apply the optimality condition to formulate a parametric dual problem and we prove weak duality, strong duality, and strict converse duality theorems.

Luiza Badin (Academia de Studii Economice din Bucuresti)

Nonparametric vs. Parametric Approach to Efficiency Measurement: An Empirical Study

In this paper we investigate the finite sample performances of some popular estimators of Farrell efficiency measures. We provide empirical comparison of nonparametric estimators with the maximum likelihood estimator of efficiency, derived using a parametric stochastic frontier model. The comparison is made on both real and simulated data sets. The results show that although the nonparametric approach requires large samples in order to

provide reliable estimators in a multivariate setup, the parametric approach can easily fail under wrong specification of the model.

Vlad Stefan Barbu and Nikolaos Limnios (Université de Rouen, Université de Technologie de Compiègne)

Estimation of semi-Markov and hidden semi-Markov chains

This presentation is an overview of the authors' research on discrete-time semi-Markov and hidden semi-Markov models, mainly based on Barbu et al. (2004); Barbu and Limnios (2007a, 2006a,b, 2007b). For a semi-Markov process, the sojourn time distribution in a state can be any arbitrary discrete or continuous distribution, as opposed to the Markovian case, where we have the constraint of geometrical or exponential distribution. This is the reason why semi-Markov processes are more general and better adapted to applications than the Markov ones. First, we introduce the discrete-time semi-Markov processes, give some basic definitions and results, propose nonparametric estimators for the main characteristics of such processes (semi-Markov kernel, semi-Markov transition probabilities, etc) and investigate the asymptotic properties of these estimators.

Second, we are concerned with reliability theory/survival analysis of discrete-time semi-Markov systems. We derive closed forms for reliability indicators of such models (reliability, availability, maintainability, failure rates, mean times) and obtain nonparametric estimators for these indicators, with good asymptotic properties.

The last part of my presentation deals with hidden semi-Markov models, associated estimation problems and possible applications in DNA analysis.

Alina Barbulescu (Univ. Ovidius Constanta,)

Using the time series modeling for the estimation of the mass transfer coefficients

A mathematical model for the estimation of mass transfer coefficients at the thiols extraction from gasoline with alkaline solutions was established by processing the data obtained in a laboratory and in a pilot plant. It is a common model for all the studied thiols, unifying the results given by us in previous papers.

M. Beldiman, A. Paraschiv (I.S.M.M.A.)

On optimality and duality in multobjective programming problems involving n-set functions

We consider some types of generalized convexity and establish optimality conditions and duality results for the MOnd-Weir type and general Mond-Weir type dual problems of multiobjective programming problem which contains n-set functions.

Miruna Beldiman, Diana Vasilescu (Stanciu) (I.S.M.M.A.)

Inegalitati variationale vectoriale si inegalitati variationale scalare asociate

Scopul este de a stabili existenta solutiei unei inegalitati prevariationale vectoriale. De asemenea sunt obtinute proprietati ale multimii solutiilor si conexiuni cu multimea solutiilor inegalitatilor scalare asociate.

DISTURBANCES AND RESIDUALS IN LINEAR REGRESSION

Boscaiu Voicu, yboscaiu@yahoo.com

*The Institute of Mathematical Statistics and Applied Mathematics
"Gh. Mihoc-C. Iacob"*

Here the usual OLS estimation method of linear regression model will be considered. We are interested to evaluate a set of objects by comparing the corresponding disturbances. But because the disturbances are unobservable, the comparison will use as surrogate, the residuals.

Of course, for "enough high" sample volume, the residuals are "good approximations" for disturbances, because OLS estimators are consistent and unbiased. The problem is to analyze, depending

on the sample volume, if the use of residuals instead of disturbances is justified or not for small samples.

Buiculescu Mioara (Institutul de Statistica Matematica si Matematica Aplicata)

Proprietati asimptotice pentru o anumita clasa de procese Feller

Clasa de procese considerata este constituita din procese tare Feller, ireductibile si satisfacand o conditie de explozie rapida. Proprietatile asimptotice considerate sunt de tipul celor studiate in contextul deviatiilor mari pentru masurile empirice ale procesului.

Luciana CARABANEANU / Ion MIERLUS - MAZILU
(Universitatea Tehnica de Constructii Bucuresti)

Aplicatii ale unor metode clasice de optimizare multicriteriala

Majoritatea problemelor de optimizare si cercetare implica in mod natural mai multe obiective. Solutii diferite pot produce scenarii conflictuale intre obiective diferite. O solutie extrema (intr-un sens mai bun) referitoare la un obiectiv implica un compromis in alte obiective. In lucrare sunt prezentate si exemplificate metode clasice de optimizare multicriteriala.

Inferență Bayes, Neyman și Neyman-Bayes pentru sisteme de servire

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Rezumat

În această lucrare vom folosi inferență bayesiană pentru parametrii care intervin în sisteme de servire. Vom estima parametrii și vom construi intervale de încredere și teste pentru acești parametri, cum ar fi parametrii repartiției exponențiale, ai repartiției Poisson sau ai repartiției geometrice.

Vom utiliza de asemenea inferență Neyman și inferență Neyman-Bayes pentru repartiția exponențială și repartiția Poisson.

Roxana Ciumara (Academia de Studii Economice, Bucuresti)

On L-moments Evaluations for a Class of Probability Distributions

An alternative set of descriptive measures which seems to largely overcome the classical measures are the so-called L-moments. Formally, the L-moments were introduced by Hosking in 1990 as linear combinations of order statistics of a population. Like classical moments, the L-moments provide intuitive information about the shape of a general distribution, which can be consistently estimated from their sample values. Some authors applied L-moments estimation method to extreme value distribution. They found that it performs better than method of moments and that both methods do well in small samples compared to maximum likelihood estimation. In this paper we evaluate L-moments for a class of probability distributions. We consider two cases for analyzing the L-moments: with identically and with nonidentically

distributed random variables. The results obtained are based upon (recursive) evaluation of order statistics.

Alexandru Dan Corlan (Spitalul Universitar de Urgenta Bucuresti)

Farmacologia populationala a anticoagulantelor orale

Propunem un model probabilistic al variabilitatii interindividuale a enzimelor CYP2C9, VKORC1 si a ratei sintezei precursorului factorului VII, care in general nu pot fi determinate direct in clinica. Efectul tratamentului este reprezentat printr-un sistem de ecuatii diferentiale ce descrie fenomenele de absorbtie si difuzie ale anticoagulantelor orale si reactiile biochimice in care intervin (blocarea VKORC1, inhibarea reducerii vitamin-K epoxidului si implicit a gamacarboxilarii precursorilor factorilor de coagulare VII, X si II). Variabilele aleatorii apar ca si coeficienti in sistem, care mai include si schema de administrare a medicamentelor. Scopul modelului este sa prezica, la fiecare moment de timp, repartitia variabilei de raspuns INR (International normalised ratio--raportul intre timpul de coagulare al sangelui pacientului tratat si timpul normal), astfel incat sa permita, prin ajustarea schemei terapeutice, minimizarea riscului ca un pacient cu profil genetic necunoscut sa prezinte valori extreme, si implicit a riscului reactiilor adverse. Prezentam o schema prin care masuratori succesive, cu erori, ale valorii INR ar putea fi folosite pentru cresterea informatiei din predictie.

Radu Craiu (University of Toronto)

QMC for MCMC

Markov chain Monte Carlo (MCMC) methods are central to statistical inference in frequentist and Bayesian statistics. A central topic for recent research involves improving the efficiency of MCMC algorithms. Such improvements can drastically reduce the computation times required for valid inference. We will present a general framework where quasi-Monte Carlo (QMC) techniques are used to increase the efficiency of MCMC algorithms. The examples include Gibbs and Metropolis samplers developed for complex statistical models.

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

Time - Frequency Analysis of Earthquake Records using Teager - Huang Transform

The Teager-Huang transform (THT) is considered in the time-frequency energy analysis of non-stationary signals. The THT is a combination of the Empirical mode decomposition (EMD) method and the Teager energy operator (TEO). The EMD method decomposes a signal into intrinsic mode functions and the TEO track the energy to estimate the instantaneous amplitude and frequency of the signal components. Different non-stationary earthquake motions recorded during significant seismic events are

analyzed using THT. The results are compared with other time-frequency representations.

Sorin Demetriu , Alexandru Aldea (Universitatea Tehnică de Construcții București)

Modal Parameters Estimation from Earthquake Motions Recorded in Buildings

The weak and moderate amplitude motions recorded during the recent Vrancea subcrustal earthquakes were considered to estimate the modal parameters and the response characteristics of different multistory instrumented buildings in Bucharest. Modal frequencies of buildings are identified using spectral analysis techniques and Eigensystem Realization Algorithm (ERA) method. The modal damping ratios are estimated by ERA method. The modal properties estimated from earthquake motion records are compared with the modal parameters extracted from ambient vibration records.

Dimcevici-Poesina Nicoleta (UMF Carol Davila, Bucuresti)

OPTIMAL SAMPLE SIZE IN CLINICAL TRIALS

In clinical trials, it is important to specify the sample size for attaining a specified power. Usually, the sample size is modified during the study. It is desired to do not lose of the statistical validity or the credibility. Some methods which adapt the data in an

unplanned way or in accord with prespecified rules were given by Fisher (1998), Sen and Fisher (1999), Proschan and Hunsberger (1995), Chi and Liu (1999, 2001), Barber and Jennison (2002). In this paper, we describe some methods for the determination of the sample size at the beginning or in the course of the experiment. We deduce the equivalence of those procedures and we give some examples to justify the choice of one or other of those methods in practice. The correction of a sample size in a statistical manner is flexible and permits the control and saving of resources.

Dimcevici-Poesina Nicoleta (UMF Carol Davila, Bucuresti)

SAMPLE SIZE CALCULATION IN CLINICAL TRIALS

The sample size calculation is an integral part of clinical research. Sample size calculation should be performed based on the primary study endpoint using appropriate statistical methods under a valid study design with correct hypothesis, which can reflect the study objectives. In this paper, we describe some methods for the calculation of the sample size, based on various primary study endpoints for comparing means, proportions, variabilities. In addition, we derive some formulas based on the concept of dose-response study using analysis of variance. This problem was studied by Ruberg (1995), Fine (1997), Liu and Chi (2001) and many others. Calculation of an optimal sample size with different methods is another goal of this paper.

Dragnea Carmen (Universitatea Bucuresti)

On Lorenz Dominance

The Lorenz dominance can be used to take into account of differences in mean income as well as income inequality in case of two income distributions possessing unequal means. This paper surveys various generalizations of Lorenz curve and Lorenz dominance for multidimensional data.

Cornelia Enachescu*, Denis Enachescu** (*ISMMA, **Universitatea din Bucuresti)

Detection of outlying observations in designs of bioavailability studies

One of the problems commonly encountered in bioavailability studies is that the data set may contain some extremely large or small (i.e. outlying) observations. These observations may have an influence on the conclusion of the bioequivalence.

This contribution is structured into three parts:

- the first section presents some new Exploratory Data Analysis (EDA) techniques, such Principal Component Analysis (PCA) and Projection Pursuit (PP), for detection of possible outlying subjects in designs of bioavailability studies;
- in the second section, a discordance test for one or more outlying observations for an individual subject, based on sample Kurtosis, is discussed;
- in section three, the AUC (Area Under the Curve) data (both raw data and log-transformed data) of the two erythromycin formulation in Clayton and Leslie's study are used to illustrate the procedures presented above.

Although computer intensive, the above EDA techniques are efficient in detecting outlying subjects and observations.

Ioan Golet (Universitatea Politehnica Timisoara)

Fixed Point Theorems for Multivalued Mappings in Probabilistic Metric Spaces

In this paper some contraction conditions in a class of generalized probabilistic metric spaces are defined and some fixed point theorems are proved. As applications, some new fixed point theorems in probabilistic normed spaces are obtained.

Wilfried Grecksch (Martin-Luther University Halle-Wittenberg)

An optimal control problem for a stochastic infinite-dimensional fractional linear differential equation

Let $(\Omega, \mathcal{F}, \mathbf{P})$ be a complete probability space, K, H be separable Hilbert spaces. $\mathbf{E}$ denotes the expectation defined by the probability measure $\mathbf{P}$. Let Q be a nonnegative self adjoint trace class operator on K . We consider a K valued fractional Brownian motion $(W^h(t))_{t \in [0, T]}$ with Horst index $h \in]1/2, 1[$ and covariance operator $(1/2)(t^{2h} + s^{2h} - |t - s|^{2h})Q$ (see [4]).

We introduce as in [3], [4] a stochastic integral $\int_0^T G(t) dW^h(t)$ for deterministic Hilbert-Schmidt operator valued functions $G(t) : K \rightarrow H$. $(\cdot, \cdot)_H$.

It is possible to find a function ϕ , so that $M^h(t) = \int_0^t \phi(t, s) dW^h(s)$ defines a K valued martingale. The real case was considered in [6] (fundamental martingale).

There are relations between stochastic integrals with respect to W^h and M^h .

It is introduced a linear controlled stochastic evolution equation

$$dX(t) = AX(t)dt + B(t)U(t)dt + G(t)dW^h(t), \quad X(0) = X_0 \in H, \quad (1)$$

where the solution is defined by the generalized solution over a triple of rigged Hilbert spaces (V, H, V^*) . The set $\mathcal{U}$ of admissible controls is the set of adapted H valued processes U with $\mathbf{E} \int_0^T \|U(t)\|_H^2 dt < \infty$.

We consider a quadratic goal function

$$\begin{aligned} J(U) = F(U, X) = & \frac{1}{2} \mathbf{E}(M_T X(T), X(T))_H + \\ & + \frac{1}{2} \mathbf{E} \int_0^T ((M(t)X(t), X(t))_H + (R(t)U(t), U(t))_H) dt, \end{aligned}$$

where X is the solution of the state equation. We assume such conditions, so that J is strong convex over $\mathcal{U}$. The optimal control problem consists of the determination of $U^* \in \mathcal{U}$ and the corresponding solution X^* of equation (1), so that

$$J(U^*) = F(U^*, X^*) = \inf\{F(U, X) : U \in \mathcal{U}\}. \quad (2)$$

U^* is denoted by optimal control.

The dynamic optimization or maximum principles are used to prove the optimality of admissible controls in the case of $h = 1/2$ (Wiener process W), where the Markov property of the state process or the martingale property of W are essential for the proof. But a fractional Brownian motion is not a Markov process and not a martingale.

A real valued fractional linear quadratic stochastic regulator is discussed in [5]. A maximum principle is considered in [1] for the case of a controlled finite dimensional fractional stochastic differential equation.

If $U \in \mathcal{U}$ and the corresponding solution of (1) are given, we introduce the following backward stochastic differential equation for the pair of unknown adapted processes P and β with

$$dP(t) = -AP(t)dt - M(t)X(t)dt + \beta(t)dM^h(t), \quad P(T) = M_T X(T), \quad (3)$$

where the solution definition of P is analogous to X and the values of the process β are Hilbert Schmidt operators in H .

We prove and discuss the following Theorem:

Theorem. *Assume that $U \in \mathcal{U}$ is so, that $U(t) = -R^{-1}B^*(t)P(t)$ where P, β are $\mathcal{F}_t$ adapted processes which satisfy equation (3). Then U solves the optimal control problem.*

Further we can calculate representations of $P(t)$ and $\beta(t)$ and show, that U^* is the unique optimal control.

Grosu Corina (Univ. Politehnica, Bucuresti)

Perturbation stability in linear and nonlinear problems

Assignment problems in economy, optimal nondestructive control, simulation of biological compartments, employ a nonlinear evolutionary model for which the stability problem of the equilibrium point is a basic condition of the prognosis. While solving the system subject to certain nonlinear restrictions was already discussed in the specialized literature, the present paper aims at treating the problem when the available results are subject to noise perturbations, which may allow a certain feedback system for allowing stability .

Iuliana Florentina Iatan (Universitatea Tehnica de Constructii Bucuresti)

BAYESIAN CLASSIFIER BASED ON THE MULTIVARIATE NORMAL DISTRIBUTION

The aim of this paper is the Bayesian estimation techniques to obtain the form of the a posteriori density $p(\mu | D)$ and the desired probability density $p(X | D)$ in the case when $p(X | \mu) \approx N(\mu, \Sigma)$. The treatment of the multivariate case in which Σ is known but μ is not represents the generalization of the univariate case (see [5]).

This approach is then used in Bayesian classification.

Iuliana Florentina Iatan (Universitatea Tehnica de Constructii Bucuresti)

Face Recognition using the the Sequential K-means Procedure

It may sometimes happen that we do not have all the data points at once, but rather obtain them gradually over a period of time. The sequential K-means procedure offers us the flexibility of updating the means as new data points arrive.

The goal of this paper is to construct the algorithm of the sequential K-means method. Then I shall present the Matlab program which uses this method for face recognition. Our presented face recognition cascade has two stages:

- a.Feature extraction using Principal Component Analysis
- b.Pattern classification using the sequential K-means method.

Tzvetan Ignatov (Sofia University Climent Ohridski)

The use of the Lorenz curves and one of its dynamic limit to measure the inequality of incomes

Let $F(x)$ be the distribution of income by size. If the distribution function $F(x)$ has a finite mean μ then we may define the Lorenz curve by

$$L(u) = \frac{1}{\mu} \int_0^u F^{-1}(y) dy, \quad 0 \leq u \leq 1$$

where $F^{-1}(y)$ is the corresponding inverse function $F^{-1}(y) = \sup\{x : F(x) \leq y\}$, $0 < y < 1$.

The Lorenz curve $L(u)$, $0 \leq u \leq 1$ depends on $F(x)$ and it can be extended to a distribution function $L^F(u) = L(u)$ for $0 \leq u \leq 1$; $L^F(u) = 0$ for $u < 0$; $L^F(u) = 1$ for

$u > 1$.

Introduce the sequence of distribution functions : $H_0^F(x) \equiv F(x)$,

$$H_1^F(x) = L^{H_0^F}(x) \equiv L^F(x), H_2^F(x) = L^{H_1^F}(x), \dots$$

The main result in this paper is :

Theorem . For any distribution function $F(x)$ of a non-negative random variable with finite mean the sequence

$H_0^F, H_1^F, H_2^F, \dots$ converges uniformly to the distribution function

$G(x) = x^{(1+\sqrt{5})/2}$ if $0 \leq x \leq 1$; $G(x) = 0$ if $x < 0$; $G(x) = 1$ if $x > 0$,
i.e.,

$$\sup_{-\infty < x < +\infty} |H_n^F(x) - G(x)| \xrightarrow{n \rightarrow +\infty} 0$$

Ioacără S¹, Ionescu-Tîrgoviște C¹, Glavce C², Popa I².

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Estimarea circumferinței abdominale actuale și ideale, la subiecți cu și fără diabet zaharat tip 2, folosind parametrii clinici simpli

Scop: Estimarea circumferinței abdominale (Cabd) actuale și ideale la subiecți cu și fără diabet zaharat (DZ) tip 2, cu vârste între 25 și 75 de ani.

Subiecți și metodă. S-au analizat crossecțional 1163 subiecți, cu vârste între 25 și 75 ani, din care 477 (41%) femei și 686 (59%) bărbați; 320 (27,5%) subiecți cu DZ tip 2 nou descoperit și 843

(72,5%) clinic fără diabet. Subiecții cu DZ au fost înregistrați în 2001 la Centrul Antidiabetic București, iar cei fără DZ sunt furnizați de Institutul de Antropologie București și provin din București și provincie. Cabd actuală a fost estimată prin regresie liniară multiplă din vârstă (Vrs - ani), Sex, greutate actuală (Gact - kg), înălțime (I - cm) și prezența DZ. S-au folosit următoarele constante: Sex = 1 pentru bărbați și 0 pentru femei, K = 0,9 pentru femei și 1 pentru bărbați; DZ = 0 pentru normali și 1 pentru DZ tip 2 nou descoperit. Cabd ideală a fost estimată similar cu Cabd actuală, dar folosind în loc de Gact greutatea ideală (Gide). Gide s-a calculat folosind formula Metropolitan Life Insurance, care este general acceptată: $Gide = K * (50 + 0.75 * (I - 150) + 0.25 * (Vrs - 20))$.

Rezultate: Comparativ cu subiecții normali, subiecții cu DZ au avut valori semnificativ mai mari pentru Vrs ($41,8 \pm 10,9$ ani normali față de $58,7 \pm 9,6$ ani DZ, $p < 0,001$), indexul masei corpului ($25,5 \pm 4,3$ Kg/m² față de $30,7 \pm 6,2$ Kg/m² DZ, $p < 0,001$) și Cabd actuală ($88,1 \pm 14,3$ cm normali față de $103,2 \pm 12,4$ cm DZ, $p < 0,001$). Cabd actuală și ideală pot fi estimate prin următoarele formule:

Cabd actuală = $74,254 + 0,682 * Gact + 0,188 * Vrs - 0,261 * I + 3,776 * DZ + 2,002 * Sex$ ($R^2 = 0,63$, $p < 0,001$). Atât constanta, cât și coeficienții variabilelor sunt semnificative statistic ($p < 0,01$).

Cabd ideală = $32,8225 + 0,1705 * Vrs * (K + 1,1026) + 0,261 * I * (1,9598 * K - 1) + 3,776 DZ - 2,6015 * Sex$.

Concluzii: Circumferința abdominală poate fi prezisă ($R^2 = 0,63$, $p < 0,001$) folosind următorii parametrii clinici (în ordinea importanței lor, evaluată prin coeficienții Beta standardizați): Gact, Vrs, I, DZ și Sex. DZ tip 2 se asociază cu o Cabd cu 3,8 cm mai mare față de normali, pentru aceeași Gact, Vrs, I și Sex, sugerând importanța distribuției abdominale a obezității, ca factor de risc pentru DZ tip 2. Altfel spus, la subiecții fără DZ, riscul pentru DZ tip 2 pare să crească odată cu numărul de cm în plus ai Cabd actuale reale față de Cabd actuală calculată prin formulă, riscul

fiind mare la +3,8 cm, dar foarte probabil nu maxim. Circumferința abdominală ideală este un concept nou, cu vaste implicații în practica medicală, singura recomandare oficială existentă în prezent fiind menținerea Cabd la <94 cm la bărbați și <80 cm la femei. Următorul pas ar fi perfecționarea formulei de predicție a Cabd ideale, cu validarea ei în cadrul unui studiu dedicat și întocmirea în final a unor tabele de Cabd ideală similar cu tabelele existente în prezent pentru greutatea ideală.

Laszlo Lakatos (Universitatea "Lorand Eotvos" Budapesta)

Cyclic waiting systems

We consider a special class of retrial systems, the so-called cyclic-waiting ones functioning in the following way: if the entering entity cannot be serviced upon arrival it joins the queue in which it is cycling with a fixed cycle time T , its further requests for service may be put only at moments differing from the moment of arrival by the multiples of this T . The original problem was raised in connection with the landing process of airplanes, later it appeared as exact model for transmission of optical signals where because of lack of optical RAM the fiber delay lines (FDL) are used. The quality of functioning of queueing systems may be considered from the viewpoint of the owner of system and from the viewpoint of individual customers, the measures of quality may partly overlap. For the owner the queue length gives the primary information, for the customers the waiting and sojourn times play essential role.

For the cyclic-waiting systems the determination of these measures requires different approaches. We started our work with the queue length by using the embedded Markov chain technique, considering the number of customers at moments just before starting the services of customers. Other authors were dealing with the waiting time at the arrival epochs.

We find for exponentially (geometrically) distributed interarrival and service times the queue length and waiting time generating functions and show that the two approaches meet at the stability condition.

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Alexei Leahu (Univ. "Ovidius" Constanta)

Asupra unor procese de quasi-reinoire

Procesele de quasi-reinoire reprezinta o alternativa atractiva ca modele ce descriu comportamentul echipamentelor reparabile in Teoria fiabilitatii. In lucrare sunt abordate unele procese de acest tip in vederea aflarii repartitiei numarului de reinoiri, dar si a functiei de reinoire.

Hannelore Lisei (Universitatea Babes-Bolyai, Cluj-Napoca)

Long Time Behaviour of the Solution of a Stochastic Navier-Stokes Equation

We study the long time behaviour of the solution of a stochastic Navier-Stokes type equation perturbed by fractional Brownian motions

$$\begin{aligned} dX_t &= \left(\nu \sum_{i=1}^2 \frac{\partial^2 X_t}{\partial x_i^2} - \sum_{i=1}^2 X_t^i \frac{\partial X_t}{\partial x_i} + F(X_t) - \nabla p_t \right) dt \\ &\quad + \sum_{j=1}^m \left(b^j X_t(x) + \sum_{i=1}^2 c^{ij}(x) \frac{\partial X_t}{\partial x_i} \right) d\beta_t^j, \quad (t, x) \in (0, T) \times G \\ \operatorname{div} X &= 0, \text{ in } (0, T) \times G \\ X &= 0, \text{ on } (0, T) \times \partial G \\ X_0(x) &= h(x), \text{ in } G \subset \mathbb{R}^2, \end{aligned}$$

where X is the velocity field of the fluid, F is a Lipschitz continuous function, p is the pressure, $(\beta^j)_{j=1,m}$ are independent fractional Brownian motions with Hurst index $H_j \in (\frac{1}{2}, 1)$. We prove the existence of a random global attractor by using a stationary transformation of the given equation.

Radu Lupu, Cristiana Tudor (ASE Bucuresti)

Dynamic skewness and kurtosis at the Bucharest Stock Exchange

Our study provides an analysis of the change in Romanian stock returns with respect to changes in skewness and kurtosis and tries to identify the sensitivity of the change in volatility with respect to changes in the sign of the stock returns when we control for these third and fourth order moments. The dynamics allows for stochastic volatility and stochastic skewness modeled under the framework of asymmetric jumps in a jump-diffusion equation

Mircea Iulian, Novac Laura (ASE Bucuresti)

Autoregresivitatea si heteroscedasticitatea pietei asigurarilor din Romania

In lucrare studiem piata asigurarilor din Romania folosind modelarea prin procese autoregresive homoscedastice si heteroscedastice a gradului de penetrare, a primelor brute subscrise si incasate, a despagubirilor, indemnizatiilor brute si rascumpararilor platite in asigurarile generale si de viata. Sunt facute predictii asupra valorilor de interes si sunt trase concluzii privind comportamentul pietei pe categorii de asigurari la anumiti factori perturbatori.

Miroiu Maria (Universitatea din Pitesti)

Some statistical properties of the large margin algorithms

In this paper we study risk bounds and universal consistency for large margin algorithms, especially for AdaBoost.

Stefan Mititelu (Universitatea Tehnica de Constructii)

Efficiency and duality for multiobjective fractional control problems with (ρ, b) -quasiinvexity

Necessary conditions for the normal efficiency of a point in a multiobjective fractional control problem (MFCP) are established. Using some (ρ, b) -quasiinvexity hypotheses, for (MFCP) is developed a duality of Mond-Weir type. This duality is based on weak, direct and converse duality theorems.

Munteanu Bogdan Gheorghe (Universitatea Transilvania din Brasov)

Central limit theorem and convergence of Mallows distance. General case

A new proof of the classical Central Limit Theorem in the Mallows distance is given. Our proof is elementary in the sense that it does not require complex analysis, but makes use of a simple subadditive inequality related to this metric.

Romeo NEGREA (Universitatea Politehnica din Timisoara)

ON THE REGULARITY OF THE SOLUTIONS IN BACKWARD STOCHASTIC DIFFERENTIAL EQUATIONS

The aim of this work is to establish the conditions relative to the coefficients for the continuity of solution with respect to the final condition and respectively, the problem of parametric dependence of the solution process on the coefficients in a class of Backward Stochastic Differential Equations in some non-lipschitz conditions.

Alina Nicolae (Universitatea Transilvania Brasov)

Some results concerning the convergence of a nonhomogeneous Markov chain

We describe sufficient conditions for weak, strong ergodicity and, more generally, convergence of a class of finite Markov chain in terms of similar properties of a certain chain of smaller size. A such class was proposed as mathematical model for simulated annealing, a stochastic algorithm for global optimisation.

Emil Oanta (Universitatea Maritima din Constanta)

Elemente practice de modelare stohastică folosind metoda de simulare Monte Carlo

Elemente practice de modelare stohastică folosind metoda de simulare Monte Carlo Emil Oanță , Universitatea Maritimă din Constanța , eoanta@yahoo.com Ioan Odăgescu , Academia de Studii Economice București Ilie Tamaș , Academia de Studii Economice București Unul dintre conceptele actuale este cel de “Knowledge Based Business” care constă în cercetări privind afacerile și probleme de management și este folosit pentru crearea unor rapoarte care îmbină rigoarea academică, noțiunile practice ale managerilor cu experiență și inspirația gândirii originale. Astfel de rapoarte pot fi realizate plecând de la sistemul informatic al companiei respective, pe baza unor studii, prin realizarea unor programe care utilizează informațiile deja conținute în bazele de date respective. Rapoartele create pot folosi modele deterministe, stohastice și fuzzy. În lucrare sunt prezentate două astfel de studii de caz care folosesc metoda de simulare Monte Carlo. Astfel, sunt studiate o multitudine de aspecte, începând cu generarea și testarea numerelor pseudoaleatoare de care depind modelele stohastice de nivel superior și evaluarea mărimii eșantionului de numere aleatoare care poate fi folosit cu suficientă încredere pentru a optimiza timpul de calcul, fără a compromite acuratețea rezultatelor. Primul studiu de caz se referă la evaluarea de ansamblu a capacității de producție. Aplicația este rulată cu pentru mai multe seturi de secvențe de numere pseudoaleatoare. Cel de al doilea studiu de caz se referă la studierea comportamentului pieței, fiind prognozate vânzările pentru următoarele unități de timp. Evaluarea tendinței de piață pentru un produs folosește metoda lanțurilor Markov. În final sunt evidențiate corelațiile dintre mărimea eșantioanelor de numere aleatoare, calitatea generatoarelor folosite și gradul de împrăștiere al rezultatelor punându-se în evidență sensibilitatea acestora.

Eugen Paltanea (Universitatea Transilvania din Brasov/Facultatea de Matematica si Informatica)

On the comparison of order statistics

Some new results concerning the stochastic comparison and hazard rate comparison of order statistics are presented. A characterization of the particular case of exponential distribution is given.

Patriche Monica (Universitatea din Bucuresti)

Echilibru pentru quasi-jocuri generalizate

Studiez existenta echilibrului pentru quasi-jocuri generalizate, folosind diverse teoreme de punct fix si teoreme de selectie.

Udrea Păun

General Δ -ergodic theory: a generalization

We set forth a generalization of the general Δ -ergodic theory of finite Markov chains.

1) Ciprian Popescu; 2) Sudratjat Supian; 3) Manuela Ghica (1) ASE Bucuresti; 2) Padjadjaran University, Indonesia)

On least squares approach in a fuzzy setting

A linear regression model in a fuzzy environment is given. Least squares method for describing the links between an initial set of independent variables and the response variable, along with an algorithm is presented.

Georgiana Popovici (Universitatea Bucuresti)

On the Behaviour of the AR(p) processes near the stationarity border

There is an extensive literature on the stationarity conditions for the AR(p) processes. These conditions generate “stationarity domains” in the parameter space of the process. The paper proposes an evaluation of the stationarity character inside and near the border of the stationarity domain. Some important differences for parts of the border are identified (in terms of different patterns for convergence to zero of the autocorrelations). Then it focuses on the evaluation of the “threshold-lag” from which the stationarity character becomes obvious for the processes having the parameters inside and near the border of the stationarity domain.

Irina Prasacu, Constantin Mircioiu (U.M.F. "Carol Davila")

Outliers between Mathematical and Biological Variability

Paper presents some problems in clinical bioequivalence studies implying decisions with important consequences on patients and/or drug producers. It is shown that complexity of the problems arises from the high variability of biological responses and lack of a clear classification in normal and pathological physiology. As examples are considered the studies including both poor and extensive

metabolizers (propafenone and nicergoline) and drugs instable in gastrointestinal tract (omeprazole and pantoprazole).

Preda Cristian, Gilbert Saporta, Damiana Costanzo (Universitatea Lille 2)

Predictie anticipata in analiza discriminanta pe date functionale

Consideram cazul analizei discriminante liniare cu raspuns de tip binar si predictor functional (functie definita pe $[0, T]$). Propunem o metodologie de anticipare a predictiei, i.e, determinarea $t^* < T$ astfel incat predictia pe $[0, t^*]$ sa fie de aceeasi calitate cu cea pe $[0, T]$.

Vasile Preda*, Costel Balcau** (Universitatea din Bucuresti*, Universitatea din Pitesti**)

Maximization of Iosifescu-Theodorescu Entropy for Homogeneous and Stationary Multiple Markov Chains with Convex Constraints

Using the geometric programming method, we obtain some duality results for the problem of maximum Iosifescu-Theodorescu entropy of finite, homogeneous and stationary multiple Markov chains with convex constraints imposed of r -step transition probabilities. As particular cases we derive the following three situations: quadratic constraints, linear constraints and without explicit constraints.

Vasile Preda*, Roxana Ciumara** (Universitatea din Bucuresti*,
Academia de Studii Economice**)

Some Estimators of Poisson Mean under Three-parts Balanced Loss Functions

In this paper we focus on the estimation of Poisson mean using three-parts balanced and weighted balanced loss functions. Relative to some prior distribution, we find an estimator of a linear type for the Poisson parameter, considering the loss of three-parts balanced form. Furthermore we compute the risk and Bayes risk functions in this case. Also, some classes of admissible linear estimators are obtained. On this line, Bayes estimators relative to the three-parts weighted balanced loss function are discussed and the class of linear estimators under three-parts weighted balanced loss function are presented.

Preda Vasile, Rusu Alin Marian (Universitatea Bucuresti)

Asupra unor estimatori Gamma-MiniMax in caz multinomial

In cazul multinomial se construiesc estimatori de tip MiniMax cu functie de pierdere patratica si spatiu al parametrilor definit de anumite sisteme de inegalitati.

PURCARU ION, BEGANU GABRIELA (ASE Bucuresti)

O GENERALIZARE A DIVERSITATII PONDERATE A LUI GUIASU

Pornind de la diversitatea ponderata introdusa de C.R. Guiasu si S. Guiasu in 2003, in lucrare este prezentata o generalizare a acestei masuri.

Comparison of two $G/G/1$ queues and of two risk processes

Ana Maria Răducan

Institutul de Statistică Matematică și Matematică Aplicată „Gheorghe Mihoc – Caius Iacob” anaraducan@yahoo.ca

A $G/G/1$ queue is essentially determined by two sequences of i.i.d. random variables, independent among themselves, $(S_n)_n$ – the service time – and $(T_n)_n$ – the interarrival times.

Let F be the distribution of S_n and G be the distribution of T_n . Denote this queue by $\{F_S, F_T\}$. The waiting time of the n 'th customer is denoted by W_n and its distribution by G_n .

A classic risk process is a stochastic process $V(t) = S_1 + \dots + S_{N(t)} - ct$ where $N(t)$ is a renewal process describing the number of claims on the interval $[0, t]$, given by the interarrival times $(\sigma_n)_n$, c is a constant and S_n is the value of the n 'th claim. The maximum aggregated loss after n transactions is L_n denoted by. If F_S and F_T are the distributions of S_n and of $T_n := c\sigma_n$ then we also may denote this risk process by $\{F_S, F_T\}$. The distribution of L_n is also denoted by G_n .

We show that there is an equivalence between $\{F_S, F_T\}$ considered as a queue and the same $\{F_S, F_T\}$ considered as a risk process in the sense that W_n and L_n have the same distribution.

In the second case the tail of G_n is the ruin probability after n transactions, ψ_n .

We study the following relation between two queues – or risk processes : say that $\{F_S, F_T\} \mathbf{pp} \{F_{S^*}, F_{T^*}\}$ iff $G_n \mathbf{p}_{st} G_n^*$ for every n . In words, the first queue is better if the waiting time is shorter for all customers or, alternatively, the first risk process is better than the second one if the ruin probability after n transactions is smaller in the first scenario than in the second one.

The ratio $\rho = \frac{ES_n}{ET_n}$ is called “the traffic intensity” in the queuing interpretation of $\{F_S, F_T\}$ and it is equally to $\frac{1}{1+\theta}$ in the risk interpretation, where θ is the loading factor.

We prove the following

THEOREM. If

1. $F \mathbf{p}_{st} F^*$ and $\rho \leq \rho^*$
2. $F * G_- = (1-\alpha)F + \alpha G_-$, $F^* * G_-^* = (1-\alpha)F^* + \alpha G_-^*$

Then $\{F_S, F_T\} \mathbf{pp} \{F_{S^*}, F_{T^*}\}$

Radulescu Marius, Radulescu Sorin, Radulescu Constanta Zoie
(Institutul de Statistica Matematica si Matematica Aplicata)

Crop planning under risk

Agricultural production is vital to the nation's security and economic welfare. It is subject to various risks. We mention here a few of them: weather risks, pests risks, diseases risks, market risks, the interaction of technology with other farm and management characteristics risks, genetics risks, machinery efficiency risk and the quality of inputs risks. Increasingly, farmers almost the world

over are being exposed to unpredictable competitive markets for inputs and outputs, so that. price or market risk is often significant and may increase over time. Market risk includes the risks generated by the unpredictable currency exchange rates. Sound planning determines a favorable outcome or yield for the farmer and mitigation of the risks. In the paper is described a multicriteria model for crop planning in agriculture. The model takes into account weather risks, market risks and environmental risks. Input data include historical land productivity data for various crops and soil types and yield response to fertilizer/pesticide application. Some special cases of the model are discussed.

Rusu Alin Marian (Universitatea Bucuresti)

Probleme de reconstructie entropica

Modul in care este folosita metoda entropiei maxime la rezolvarea problemelor liniare inverse cu constrangeri pe un spatiu infinit dimensional in stransa legatura cu reconstructia maxentropica a semnalului si aplicatie la obtinerea matricii nenegative cu sume fixe pe linie si coloana.

Serban Florentin (ASE,Bucuresti)

Valoarea unei actiuni-analiza fundamentală sau analiză tehnică ?

In acest articol sunt descrise modalități de a optimiza condițiile unei tranzacții la bursa de valori. Sunt prezentate pe rând analiza fundamentală și analiza tehnică a unei acțiuni. Un investitor trebuie să folosească ambele analize pentru a obține semnale clare de vânzare sau de cumpărare a unei acțiuni. Este prezentat și un studiu de caz-acțiunea Albalact(Albz), studiu însoțit de un comentariu legat de tranzacționarea acesteia.

Mariana Sibiceanu (Universitatea Titu Maiorescu Bucuresti)

Asupra largilor deviatii ale traiectoriilor aleatoare

Demonstram convergenta P-a.s. in $C[0,1]$ a traiectoriilor unui sir de procese $(X(n))$, care satisface principiul largilor deviatii si astfel incat pentru orice t sirul starilor $(X(n)(t))$ este convergent P-a.s.

Emil Simion (Advanced Technologies Institute)

WALSH-HADAMARD RANDOMNESS TEST AND NEW METHODS OF TEST RESULTS INTERPRETATION

The proposed statistical test is an extension of frequency and autocorrelation tests and can detect a general class of defects which can appear in (pseudo)random generators. The test is based on the probability distribution of the Walsh-Hadamard transform. NIST Special Publication 800-22 presents two methods of interpreting the results of one or more tests based on proportion of passing tests and uniformity of the corresponding P-values. This

paper will introduce another two methods of integration of test results based on maximum test statistics and sum of squares test statistics. The integration of test results are independent from the proposed test and may be used by all the statistical tests based on confidence intervals. Some of the applications of the proposed statistical test and decision procedures are in the following areas: (pseudo)randomness testing, cryptanalytic area and steganographic detection.

Aurel Spataru (ISMMA "Mihoc - Iacob")

New convergence rates in strong limit theorems

Under appropriate necessary and sufficient conditions, we strengthen classical results concerning probabilities of large and moderate deviations."

Stelian STANCU (Universitatea Bucuresti, ASE Bucuresti)

ANALIZA RISCULUI SI INCERTITUDINI PE PIATA ASIGURARILOR DE VIATA

In asigurari, incertitudinea si riscul sunt prezente mai mult decat in alte domenii de activitate. Ca urmare, este necesar ca societatile de asigurare sa incerce pe cat posibil sa diminueze incertitudinea legata de cererea de polite in anul ce urmeaza si riscul aferent acestor polite. Prin contractele de asigurare, societatile de asigurare isi asuma raspunderea privind acoperirea daunelor a caror producere are un caracter aleatoriu, intamplator si nesigur. Lucrarea isi propune abordarea unor aspecte esentiale referitoare la fenomenul de risc si incertitudine pe piata asigurarilor de viata.

I.M.Stancu-Minasian, Andreea Madalina Stancu (I.S.M.M.A.)

Duality and nonlinear fractional programming involving rho-semilocally b-preinvex functions

A nonlinear fractional programming problem with inequality constraints is considered, where the functions involved are rho-semilocally b-preinvex and related. Necessary optimality conditions are obtained in terms of the right derivative along one direction. A Wolfe type dual is associated and weak, direct and strict converse duality are established.

Stefan Stefanescu (Universitatea din Bucuresti)

About a class of poverty indicators

The paper studies various properties for a class of poverty measures. Having a sample with the income of the individuals from a given population is estimated the suitable poverty indicator. The case of grouped data is treated too. Finally are analyzed some differences between a poverty measure and a polarization index.

Sandra Teodorescu (Universitatea Ecologica din Bucuresti)

On shifted composite models Lognormal-Pareto and Weibull-Pareto

In this paper we described the shifted composite models Lognormal-Pareto and Weibull-Pareto, the cumulative distribution functions, and the r -th initial moments; furthermore the likelihood functions are calculated and discussed some of its properties.

Aida Toma (Academia de Studii Economice)

Bounded influence tests through divergences

For testing hypotheses in general parametric models, we introduce robust tests based on dual phi-divergence estimators. We derive their asymptotic properties, influence functions and show that the stability of the level is obtained by bounding the sensitivity of the corresponding divergence estimator.

Romica Trandafir, Sorin Demetriu (Universitatea Tehnica de Constructii Bucuresti)

Aplicatii ale algoritmilor genetici in optimizarea structurilor

În numeroase probleme de proiectare inginerească apar obiective aflate în conflict, iar soluțiile acestor probleme sunt supuse mai multor restricții. Lucrarea prezintă un algoritm genetic elitist dedicat optimizării multi-obiectiv cu restricții. Algoritmul este aplicat la rezolvarea unor probleme de optimizare a structurilor.

C. Tudor, M. Tudor (Universitatea Bucuresti, ASE Bucuresti)

On double Stratonovich fractional integrals and some strong and weak approximations

Double Stratonovich integrals with respect to the odd part and even part of the fractional Brownian motion are constructed. The first and the second moments of such integrals are explicitly identified. As application of double Stratonovich integrals a strong law of large numbers for efBm and ofBm is derived. Riemann-Stieltjes integral approximations to double Stratonovich fractional integrals are also considered. The strong convergence (almost surely and mean square) is obtained for approximations based on explicit series expansions of the fractional Brownian processes. The weak convergence is derived for approximations by processes with absolutely continuous paths which converge weakly to the considered fractional Brownian processes. The above mentioned convergences are obtained for deterministic integrands which are given by bimeasures.

Emiliana Ursianu, Radu Ursianu (ISMMA, Universitatea Politehnica Bucuresti)

Vectori si valori proprii in metode de comparatie multipla

In cazul respingerii ipotezei nule, metodele de comparatie multipla (MCP) clasifica mediile celulelor dupa importanta lor. O alternativa metodelor clasice este folosirea valorilor proprii a matricei de covarianta.

Ion Vaduva (Universitatea Bucuresti)

ON A MADM STOCHASTIC METHOD

A MADM problem with n alternatives and m criteria is considered. The criteria are considere random variables with specified probability distributions. The $n \times 1$ probability vector of importance weights is also known. In order to solve the MADA problem (i.e. to

find a global hierarchy of alternatives) the entries of the decision matrix are considered in the following forms: a)concentration intervals of the standardized distributions; b)the information of entries defined in terms of entropy or informational energy. The standardization of a random variable X is the random variable $Z=X/s$, s being the standard deviation of X . In this manner, the MADM problem is reduced to the classical form and can be solved by using standard methods.

Ovidiu Veghes (Academia de Studii Economice, Bucuresti)

About the use of statistical software

The use of the software instruments in processing of data enforces the utilization manner of a pattern of thought of which the user is not always well-informed. The underline of a such limitations is sometimes useful.

Evelina Ilieva Veleva (Rousse University)

Test for independence of the variables with missing elements in the empirical correlation matrix

We consider variables with joint multivariate normal distribution and suppose that the sample correlation matrix has a missing element. Under this assumptions we derive a maximum likelihood

ratio test for independence of the variables. We obtain also the maximum likelihood estimation for the missing value.

Raluca Vernic, Elena Pelican (Universitatea Ovidius Constanta)

The Log-SkewNormal distribution with actuarial applications

It is known that insurance data are usually skewed and even heavy-tailed. Hence, the LogNormal distribution is often used to model insurance claims.

Derived from the SkewNormal distribution in a similar way as the LogNormal from the Normal distribution, we introduce the Log-SkewNormal distribution as an alternative to the LogNormal one. Numerical examples show that this new distribution can provide a better fit to real data.

Vrinceanu Gabriel (Colegiul National "Spiru Haret" Bucuresti)

Modele matematice de analiză decizională la apariția de disfuncționalități în activitatea firmei

Viata economica a unei firme este supusa unui ansamblu de situatii favorabile/nefavorabile desfasurarii propriilor activități; din interacțiunea acestor factori perturbatori (în sens pozitiv sau negativ) apar problemele cu care se confrunta realitatea economica a firmei. Într-un astfel de context, o firma se poate considera competitiva si in masura in care are dezvoltata o politica decizionala coerenta care sa urmareasca: -Prevenirea aparitiei disfunctionalitatilor in activitatea firmei; -Rezolvarea operativa si optimala a problemelor aparute. În literatura de specialitate,

managementul firmei este analizat in contextul decizional, fiind oferite diverse metode si tehnici de alegere a variantei optime si de rationalizare a procesului decizional. Lucrarea de față își propune studiul opitimizării activității unei firme prin aplicarea teoriei grafurilor , prin realizarea grafului obiectivelor, a lansării unor ipoteze de bună ordonare și a definirii și analizării indicatorilor de minimă/maximă performanță.

Yovogan Mègbé Marcellin (Sofia University “St. Kliment Ohridski”)

Corporate governance foundations in Eastern Europe: a behavioral analysis of the role of main stakeholders.

Les vagues de privatisations et les profondes transformations subies par les économies des pays d'Europe de l'Est au début des années 1990 ont abouti à l'émergence d'une élite « entreprenante », capable de prendre le risque mais également très frustrée par la possibilité de perdre le capital investi.

D'une attitude totalement accaparante à celle de la totale négligence, les comportements des nouveaux propriétaires offrent un cadre d'analyse qui permet d'expliquer les systèmes de gouvernance d'entreprise aux travers des théories de comportement issues des approches organisationnelles.

Nous avons essayé de répondre aux questionnements liés aux systèmes de gouvernance d'entreprise dans les des pays d'Europe de l'Est en nous focalisant sur les comportements des différents partenaires. Un accent particulier est mis sur les relations propriétaires – managers – et autres parties prenantes (notamment, l'Etat, les employés et les syndicats).

Ces relations sont étudiées à la lumière de la théorie de l'apprentissage organisationnel dans le cadre d'une analyse longitudinale des comportements sur des périodes allant de 1990 à 1997, de 1997 à 2001 et après 2001.

Nous avons suivi l'évolution des variables telles que : la structure du capital, le résultat financier, le nombre de salariés, le nombre des licenciements, le taux des changements de responsables d'entreprises.

Une première lecture des résultats permet de constater que jusqu'en 1999 voire 2000, le fonctionnement des entreprises en Europe de l'Est induit un comportement organisationnel très proche de l'organisation scientifique taylorienne. Des relations travail – capital, bien définies dans un cadre institutionnel feront réellement jour au début des années 2001.