ABSTRACTS

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EFFICIENCY IN AGRICULTURAL PRODUCTION: REGIONAL EVIDENCE FROM ROMANIA

This paper examines the efficiency of agricultural production in Romania at regional level between 1992-2004. We employ Data Envelopment Analysis technique and Bootstrap estimation methods, which allows us to obtain more precise estimations than conventional methods. Our paper is a good example of why Bootstrap algorithms should be used when we make use of finite samples and non-parametric methods to estimate efficiency scores. Moreover, our analysis has important policy relevant implications for the performance of agricultural sector.
Keywords: *efficiency, bootstrap, DEA, agriculture, Romania.*

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THE MONTE CARLO ESTIMATION OF A POLARIZATION INDEX FOR AN ARBITRARY DISTRIBUTION

Although the construction proposed in [9] for the polarization index $\Delta(X)$ is very simple, the effective computation of $\Delta(X)$ when X is an arbitrary random variable implies often complex expressions. So it isn't so easy to determine the variation of $\Delta(X)$ even when the random variable X has an elementary theoretical distribution ([10]).

In the present paper we intend to estimate the real value of the polarization indicator $\Delta(X)$ applying a Monte Carlo technique oriented to generate input samples. The proposed procedure is very general and can be successfully applied for any distribution of X.

Key words *: polarization index, Monte Carlo method, sample, estimation, exponential distribution, bounded support.*

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THE STACKELBERG MODEL OF DUOPOLY WITH THE POLLUTION TREATMENT COST

In this paper we consider an interesting model of Stackelberg's duopoly with the pollution treatment cost sharing. We prove that there exists a unique equilibrium in some suitable conditions. An illustrative example is considered.
Keywords: game theory, equilibrium point, Cournot's and Bertrand's model of duopoly, Stackelberg's model.

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SADDLEPOINT APPROXIMATIONS FOR RUIN PROBABILITIES

Ruin probabilities under the classical Poisson risk model are considered via a saddlepoint approximation. For this purpose, Barndorff-Nielsen and Schmidli (1994) used a relatively complicated saddlepoint approximation with two parameters. The present work shows that only one parameter is needed in order to obtain accurate approximations of ruin probabilities. Furthermore, based on the asymptotic behavior of the time to ruin, a saddlepoint approximation that uses an Inverse Gaussian baseline distribution is developed. A numerical example illustrates the accuracy of the new proposed method.
Key words: classical risk model, phase-type distribution, ruin probabilities, saddlepoint approximation.

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ARTIFICIAL INTELLIGENCE TECHNIQUES APPLIED TO THE EVALUATION OF THE RESEARCH AND TECHNOLOGY DEVELOPMENT PROJECTS AND PROGRAMMES

The paper presents the specific ways in which indicators and artificial intelligence methods and tools can be used for the evaluation of research projects and programmes. The author's research purpose is to improve the programme ex post evaluation and ex ante impact assessment thought the development of a improved set of strong integrated research performance indicators, structured according to the results chains and comprehensively described using a standard indicator template; the development of data sets

and databases for projects and programmes evaluation and, finally the development of projects and programmes evaluation techniques, based on database and machine learning technologies.

Using these methods a new and better understanding of the scientific, technological, human resources, structuring, economic, social, environmental etc impacts of national and European research programmes is possible. The research is financed by the Minister of Education and Research, IDEI programme.

Key words: *KPI, RTD project, RTD programme, data mining, project portfolio, indicator template.*

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CONSIDERATION ABOUT THE OPTIMAL EXPLOITATION DOMAIN OF INDUSTRIAL DUST REMOVER WITH TEXTILE FILTER

In industry there are many technologies which can pollute through the dust relieved in the working environment and surrounding environment, if there is no intervention through adequately technical means concerning the domain of industrial dust removing.

Since industrial dust removing implies high cost, it is rational that the news and the technical progress to be obtained taking to account the need of optimization in this domain.

The optimization must be taken to account at the conception of the new technical solutions and also to the choice and exploitation of the dust separator. By the optimization one are looking for to obtain an adequate dust removal with minimum cost of investment (including metal use), electrical energy, filtrate material, maintenance, etc.

In the present article we present the computation basis which is drive to the elaboration of the relation for establishing of the total dust removal cost, through an original approach in order to facilitate the used of the computers.

Keywords: *industrial dust removal, textile filter, optimization, total dust removal cost.*

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THE PARTNER SELECTION PROBLEM IN A VIRTUAL ENTERPRISE

With the globalization of economic markets and the individuality of markets demands, virtual enterprise is becoming an increasingly important organization since it can respond rapidly to market changes and make resource sharing more efficient among manufacturing partners. In this environment, potential partners may be dispersed geographically and posses different core competencies. This paper deals with the partner selection problem which takes into account the bid cost and the bid completion time of subprojects, the due date and the budget constraint. Properties of the problem are analyzed and two algorithms are discussed.
  Keywords: *Virtual Enterprise, Partner selection.*

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INDICATORS AND METHODS FOR CHARACTERISING REGIONAL SPECIALIZATION AND CONCENTRATION

This paper proposes a review of the most frequently employed indicators and methods for quantifying the regional specialization and concentration. It refers to Herfindhal, Krugman, Gini, Ellison-Glaeser, Theil indexes as well as to a series of measures of spatial concentration, accompanied by the vectorial analysis adapted for the regional scale. Their relevance in the process of spatial analysis is discussed, emphasizing the need of comparisons between the results provided in each case.
  Key words: *regional specialization, regional concentration, index, vectorial analysis.*

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MEASURING THE RISK AVERSION

We will define the equivalence of the behaviour or attitude for two agents using the initial endowment and also we will find a new measure for risk aversion (non –neutrality towards risk). This represents another possibility to measure the risk aversion referring the neutrality towards risk, not for a single value x_0, but for an interval $[0, x_0]$.
  Keywords: *risk aversion, utility function, risk premium, risk neutrality*

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AN EXTENSION OF DIRECTIONAL EFFICIENCY MEASURES

The efficiency measures show how efficient (or inefficient) is a decision-making unit on the direction selected but it nothing says about the purport of this direction and who is the direction who must be selected. Also, the directional models fix from the beginning same direction for every production unit albeit they are different situated respecting frontier. It is very probable that each production unit prefer certain directions, these directions depending by her present structure, present dimension, future objectives etc.

We propose in this section to introduce one measure that may be an answer of this.
Key words: *Directional efficiency measures, Data envelopment analysis (DEA), Efficiency measures, Efficient frontier.*

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INTEREST RATE RISK MEASUREMENT AS A COMPONENT OF INTEREST RISK MANAGEMENT IN COMMERCIAL BANKS

Banks have always faced the risk of losses in on and off-balance-sheet positions arising from undesirable market movements. The sharp increase of proprietary trading in many banks has heightened the need among regulators to ensure that these institutions have the management systems to control and the capital to absorb the risks posed by market-related exposures. But as a risk, market risk (interest rates, foreign exchange rates, price risk) only gained a high profile when the Basle Committee on Banking Supervision published "The Supervisory Treatment of Market Risks" in April 1993. This risk now requires increased attention and consideration due to the very volatile nature of interest and exchange rate movements. Interest rate volatility has increased dramatically over the past twenty-five years and for that an efficient management of this interest rate risk is strong required. In this article, we will discuss about interest rate risk measurement as a main component of interest risk management. The article provides a overview of the various techniques used by banks to measure the exposure of earnings and of economic value to changes in interest rates. Their complexity ranges from simple calculations to static simulations using current holdings to highly sophisticated dynamic modelling techniques that reflect potential future business and business decisions. Also, the article presents an efficient practical example for measuring interest rate risk based on a methodology that is used with success by many Romanian banks and that is in accordance with Basel II Accord for Capital Requirements.
Key words: *interest rate risk, gap analysis, duration gap analysis, risk measurement, bank.*

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DECISION-MAKING MODELS UNDER UNCERTAINTY CONDITIONS IN CASE OF THE PORTFOLIO-SELECTION PROBLEM AND FLEXIBLE PLANNING

We analyze the portfolio – selection model and the flexible planning, as practical methods to making the investment decisions under uncertainty conditions.
__Key words:__ investments, uncertainty, portfolio-selection problem, flexible planning, profitability of securities, investor's risk attitude, enterprise liquidity, nature state.

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SOME COMMENTS ON ENTROPY AND INFORMATIONAL ENERGY. AN APPLICATION IN STATISTICAL QUALITY CONTROL

After a brief excursion in the genesis of entropy and informational energy concepts, we prove that Stamatiu's form $S = -p \ln p$, $0 \le p \le 1$ for the entropy of an one-state system (see Stamatiu, 2002 [34]) is the solution of the following functional equation:

$$\frac{f(xy)}{(xy)^k} = \frac{f(x)}{x^k} + \frac{f(y)}{y^k}, \quad k > 0.$$

Then, some important results concerning the so-called Onicescu's index of informational energy are discussed: we trace the roots of this one back to Gini's index of diversity and Rényi's entropy of order alpha (see Burgio, 1969 [3]).
A general form of entropy proposed by Purcaru and Beganu (1993, [26]) is related to Scala's entropy ratio (1965, [31]), this later one being used to prove entropical convergence of a sequence of continuous random variables to a given distribution-usually, the normal one.
In the last section we present an actual case study concerning the stability of precision of a technological process, investigating it by using Văduva's procedure (1970, [36]) to replace the one-way ANOVA model with a model concerning proportions. We employed here the sample ranges instead of averages – as ANOVA does.
__Key words:__ weighted entropy, informational energy, Stamatiu's log-function, entropic convergence, Văduva's procedure.

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ANALYSIS OF MACROECONOMIC PRODUCTION FUNCTIONS FOR ROMANIA (part two – cross-section approach)

In this second part of our research we have employed aggregate production functions in the variant of cross-section for analyzing Romania's economic growth from the standpoint of the intensity of using capital and labour factors, as determinant elements for the level of output.
        Key words: *production function, Cobb-Douglas, cross-section, technological change.*

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SOME CONSIDERATIONS ON THE INFORMATION AND DIVERSITY MEASURING

        In this paper, we propose a new family of parametric measures of information and of diversity, generalizing the classical measures of Shannon (1948) and Guiaşu (1968) entropy and of Gini (1912), Simpson (1948), Onicescu (1966) and Guiaşu (2003) diversity.
        Key words: *information entropy, weighted entropy, concentration index, diversity index, weighted diversity index, Maximum Information Principle, Maximum Diversity Principle.*
MSC 2000: G2P20, 91B82, 94A17

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ORDERING EDUCATIONAL OFFERS USING A MODEL OF ACQUIRED COMPETENCIES

The paper presents a means of ordering educational offers according to scores, based on an input-output model of competencies acquired during the educational process. The qualitative input-output information comes from the answers provided by a representative sample of students. The information is improved using a bootstrap technique for a DEA model of production frontier. A computer application is used to estimate the efficiency scores and to build up confidence intervals for them.
Keywords: *educational process, measuring efficiency in education, ordering by efficiency scores, bootstrap technique to estimate efficiency.*

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SOME REMARKS ON NONPARAMETRIC ESTIMATION OF CONDITIONAL EFFICIENCY MEASURES

An issue of importance in productivity analysis is the sensitivity of the efficiency scores with respect to environmental factors that might affect the production process but cannot be controlled by the producer. In this paper we summarize some recent results on nonparametric conditional efficiency estimation. Since the approach involves the estimation of a nonstandard conditional distribution, it requires the choice of a smoothing parameter (bandwidth). We also discuss the approaches to select an appropriate bandwidth available so far.
Keywords: *Debreu-Farrell efficiency measures, conditional efficiency measures, nonparametric estimation, Free Disposal Hull (FDH).*

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**IMPROVEMENT OF PROCEDURAL MODELS USING
THE ANALOGICAL / DISANALOGICAL ANTITHESIS**

*The mathematical, as well as the heuristic modelling as method to lower the
complexity of economic problems, in view to deeply studying these ones and the
simulation, as a controlled procedure for testing the system modelling results,
represent the major conjugated ways of scientific research implemented not only
for the economical field.*
*The modelling and simulation use is determined by the existence of a problem, a
deficiency which can be surpassed by an empirical or a conceptual research,
aiming at passing from an existing situation (undesirable or less desirable) to a
desirable one.*
Key words: *model, system, research, principle (concept), potential, process,
homomorphism, isomorphism, procedural modelling, antithesis, analogy,
disanalogy, algorithm, branches, simulation, method, analysis.*

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**AN ORDER LEVEL LOT SIZE INVENTORY MODEL
FOR EXPONENTIALLY DETERIORATING INVENTORY
WITH RANDOM LEAD TIME**

*In classical EOQ, the lead time is assumed to be zero, however, in practice, it is
generally observed that there is a significant lead time between the placement of an orders and its
realization into the inventory system. Various authors have tried to develop mathematical models
taking into account fixed or random lead times for non deteriorating inventory. For any
deterministic system if lead time is fixed, it is simple to deal with the situation but if lead time is a
random variable, it becomes relatively complex to analyze the situation. Many researchers have
tried to develop inventory models in which lead time is not fixed but a random variable with some
specified probability distribution. In this paper, an attempt is made to develop an order level lot
size inventory model for exponentially deteriorating inventory with random lead time. It has been
supported by a numerical example.*

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A GENERALIZED PIECEWISE LINEAR FRACTIONAL PROGRAM

This paper presents an algorithm for solving a piecewise linear fractional programming problem when the coefficients of an activity are made to satisfy a system of linear inequalities. To arrive at the desired solution, two types of problems, linear fractional programming, and linear programming problems need to be solved.
Keywords: Generalized, Piecewise linear fractional, Linear.

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BRAIN DRAIN PHENOMENA IN ROMANIA – POSSIBILITIES OF ECONOMETRICAL MODELLING

Contemporary migration process develops in a high speed way, nowadays, its main fuel being the globalization process. According to the Population Division of United Nations, there are 200 millions people included in the international migration process, double than 25 years ago. Brain-drain phenomena represents an exodus, an emigration of human capital from a poorer country to a wealthier one and is not an easy-to-quantified social indicator. This phenomena is one of the most important problems for developing countries. We try to find an answer to the question if the returned migration would have a positive effect for Romania and what econometric model would be appropriate for modelling it.
Keywords: migration, migration ratio, brain-drain, multiple linear regression model, education index, life expectancy index, returned migration..

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THE APPLICATION OF THE ECONOMETRIC MODELS WITH QUALITATIVE VARIABLES IN THE ANALYSIS OF THE NON ACADEMIC BEHAVIORS AT THE LEVEL OF THE ROMANIAN HIGHER EDUCATION SYSTEM

The purpose of this paper was to apply the econometric models with qualitative variables in order to analyze two non academic behaviors at the level of the Romanian higher education system: cheating on the exams by copying or by direct or intermediary intervention at the professor.
Key-words: *econometrics, Logit Model, survey, sample, fraud.*

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SEMI-LINEAR CREDIBILITY

An original paper which suggests a way of thinking for semi-linear credibility theory development, founded on analysis of the functions of the observable random variables.
This line of thought fits perfectly with the framework of the greatest accuracy credibility theory.
Key words: *linear functions, the transformed observations, semi-linear credibility estimators.*

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ESTIMATION OF CONTROL PREMIUM: THE CASE OF ROMANIAN LISTED COMPANIES

Control premium estimation is one of the main issues in Corporate Finance, strongly related to Corporate Governance principles and minority shareholders' protection. Taking into account the fact that the literature mainstream within estimating control premium does not make references to the companies listed on Romanian capital market this study aims to bring more information on this issue. Control premium was estimated as the abnormal return at the moment of tender bid announcements, and the results revealed a mean around 80% and a median around 44%. Such larger control premium could be an evidence for a low minority shareholders' protection.
Keywords: Corporate Governance; Control premium; Minority shareholders' protection; Capital markets; Romania