

INTRODUCTION

The volume of papers we would like to present is the result of the 22nd International Conference on Multivariate Statistical Analysis, organized by the Chair of Statistical Methods (Institute of Econometrics and Statistics, University of Łódź) and the Polish Statistical Association.

Conferences on Multivariate Statistical Analysis (MSA) have been organized every year since 1981. They have focused on the latest theoretical achievements in the field of the multivariate statistical analysis and its applications.

The scientific programme of MSA 2003 was very broad and covered most of the statistical problems, such as multivariate distributions, multivariate statistical tests, nonparametric inference, factor analysis, cluster analysis, Bayesian inference, multivariate Monte Carlo analysis, data mining, robust procedures, pattern recognition and applications of multivariate methods in marketing, finance, insurance, capital markets, risk management, medicine and health services.

The selected papers have been grouped into three thematic parts: I. *Statistical Inference*, II. *Statistical Models*, III. *Applications of Multivariate Statistical Analysis*.

The first paper devoted to the problem of statistical inference, entitled *Balanced Block Designs Leading to the Optimum Chemical Balance Weighing Design with Equal Correlations of Errors* was proposed by Bronisław Ceranka and Małgorzata Graczyk. The authors studied the estimation problem of individual weights of objects using the chemical balance weighing design under the restriction on the number times in which each object was weighed.

Authors of the next paper, Janusz Wywiół and Grzegorz Kończak, focused on the problem of the quadratic form of a sample mean and a sample variance when the sample was drawn from normal distribution. In their presentation *On the Distribution of Quadratic Form of Sample Mean and Variance* the density function of the quadratic form has been derived and some examples of its applications were mentioned.

Czesław Domański, in the paper titled *Some Remarks on Empirical Power of Tests for Pairs*, dealt with some parametric and nonparametric two or more – sample tests for matched samples. The power of nonparametric

tests: sign test, Munzel and Wilcoxon tests and the parametric Student's test for pairs was compared.

In the next paper, *A Modified Holm's Stepwise Rejective Multiple Test Procedure* by Dariusz Parys, some results of computer simulations concerning the modified Holm's multiple test procedure were reported.

Dorota Pekasiewicz proposed a paper entitled *Sequential Tests for Truncated Distribution Parameters*. Hypotheses about the mean of the truncated normal and exponential distributions and formulae of the tests' statistics were determined. Moreover, the formulae for expectations of sample sizes for the given tests were derived.

The paper entitled *Choice of the Smoothing Parameter in Kernel Density Estimation* by Aleksandra Baszczyńska discussed the problem of choosing the kernel function and the smoothing parameter in density estimation. The results of some Monte Carlo experiments were also presented.

Next two authors, Tomasz Jurkiewicz and Krzysztof Najman, in the paper *An Influence of Classification Method on Efficiency of Modified Synthetic Estimator*, dealt with the problem of a small area estimation method called synthetic estimation technique. A two-stage estimation procedure was suggested. Also some applications of the suggested procedure were presented, especially in an analysis of the continuous vocational training of employees in the construction industry based on a sample survey of enterprises.

The second part, entitled *Statistical Models*, starts with the contribution of Wiesław Wagner *Matrix H and Its Applications in Economic and Tourist Research*. The author focused on the matrix H and its properties to point the leverage observation. Special attention was directed to application possibilities in economic and tourist research.

Tadeusz Gerstenkorn devoted his paper to *Limit Property of the Compound Distribution Binomial-Generalized Two-Parameter Gamma* and discussed some properties of that distribution.

The next paper entitled *Multivalued Stochastic Processes* by Grażyna Trzpiot covered the problem of existence of the vector-valued selection processes and concluded that using the methods of selection operators it was possible to show the existence of convergence in distribution selections and stationary selections for multivalued stochastic processes.

Eugeniusz Gatnar and Dorota Rozmus in the paper *Random Selection of Variables for Aggregated Tree-Based Models* tried to solve the problem of the model stability for tree-based models. A method for random selection of variables (*RandomForest*) for an aggregated tree-based model was presented and the problem of finding its optimal parameters was discussed.

The next author, Agnieszka Rossa, in the paper entitled *Classification Tree Based on Receiver Operating Characteristic Curves* proposed a new

classification algorithm based on the properties of a receiver operating characteristic function $ROC(v)$ and on a goodness-of-fit test statistic used for testing the hypothesis $H_0: ROC(v) = v$ against $H_1: ROC(v) \neq v$.

In the paper *Robust Bayesian Prediction with Asymmetric Loss Function in Poisson Model of Insurance Risk* by Agata Boratyńska the problem of robust Bayesian prediction of a Poisson random variable under LINEX loss was studied. The conditional Γ -minimax predictors and posterior regret Γ -minimax predictors as optimal choices were constructed. The application to the insurance collective risk model was also presented.

Małgorzata Kobylińska in the paper *Comparison of Selected Criteria for Determination of the Measure of Depth of an Observation in a Two-dimensional Sample* was concerned with the measure of observation depth in a two-dimensional case. A few of criteria of the measurement of observation depth were compared.

In the last paper in this part *The Average Price Dynamics and Indexes of Price Dynamics – Discrete Time Stochastic Model*, the author, Jacek Białek, dealt with two indexes of the average price dynamic in a discrete time stochastic model. Several properties of these indexes were proven and compared with the price indexes.

The third part was devoted to the *Application of Multivariate Statistical Methods*. It consists of twelve papers concerning different economic problems.

The goal of the first paper *Skew Normal Distribution – Basic Properties and Areas of Applications* by Maria Jadamus-Hacura was to study the properties of the density function of the skew normal distribution and to investigate the applicability of this distribution for modeling some financial and income data.

Alina Jędrzejczak in the paper *The Characteristic of Theoretical Income Distributions and Their Application to the Analysis of Wage Distributions in Poland by Regions* presented the comparison of the properties of some theoretical income distributions (lognormal and Dagum) in the aspect of their application in the analysis of income distribution in Poland.

Next two authors, Eugeniusz Kwiatkowski and Leszek Kucharski, in their paper *Multinomial Logit Model and Its Application in Labor Market Position Analysis of Individuals in Poland* considered levels of education and vocational skills and their impact on the individuals' position in the labor market.

Jerzy Korzeniewski in the paper *Proposal of New Cluster Analysis Algorithm* proposed a new, two-stage method of defining clusters and compared it with other methods of cluster analysis on the basis of their application to the analysis of the same data set.

Hanna Dudek and Arkadiusz Orłowski in the paper titled *Clustering of European Countries with Respect to Food Consumption* studied the data related to average yearly *per capita* consumption of 14 main selected foodstuffs in 39 countries.

The author of the next paper, *Segmentation of Students According to Food Purchase Preferences Using Methods of Multi-dimensional Statistical Analysis*, Izabela Cichocka, used the principal component analysis and multi-dimensional scaling to classify students according to their food preferences. The paper was aimed at selecting and describing segments of young people with their various food preferences and attitudes.

The next paper *Credit Swaps as Instruments Securing from the Risk* by Agata Szczukocka considered the problem of credit swaps as the most popular derivatives to isolate the credit risk.

Alicja Ganczarek in the paper entitled *Applications of VaR and CVaR Methods on Energy Market in Poland* discussed the problem of the downside risk measures such as: Value-at-Risk – VaR and Conditional Value-at-Risk – CVaR and demonstrated the practical use of these methods. An example concerning the logarithmic rate of return of prices from the Polish Power Exchange, Balance Market (BM) from October to December 2002 and their simulation distributions was studied.

In the next presentation, *The Static Hedging of Barrier Options of Type Down-and-Out Calls* by Adam Depta, some non-standard instruments called the barrier options of down-and-out type (exotic options) on outside markets were studied. The author focused on introducing static hedging for exotic options in support about standard options.

In the paper entitled *Evaluation of the Degree of Integration among European Insurance Markets* the authors, Tomasz Jurkiewicz and Ewa Wycinka, studied the level of European insurance markets integration by using multivariate statistical techniques.

Anna Szymańska in her paper *Methods of Assessing Efficiency of Bonus-Malus Systems* discussed the role of the bonus-malus systems and proposed methods of assessment of their effectiveness.

The last paper in this section *Multivariate Analysis of Regional Differences in the Higher Education System in Poland* by Agnieszka Ordon focused on the problem of regional diversity in Poland in 2001 with respect to the level of the higher education system.

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