INTRODUCTION

The papers of this volume present the latest theoretical achievements in the field of the multivariate statistical analysis and its applications. The articles presents the following statistical problems: multivariate distributions, statistical tests, nonparametric methods, classification and discriminant analysis, Monte Carlo methods, Bayesian inference, robust procedures, censored data analysis and applications of multivariate methods in finance, insurance, marketing, socio-economic and natural sciences.

The articles have been divided in the following thematic sections: I. *Statistical Inference*, II. *Statistical Models*, III. *Applications of Multivariate Statistical Analysis*.

The papers presented in Section I deal with estimation and hypothesis testing.

The following papers focus on estimation: Aleksandra Baszczyńska and Dorota Pekasiewicz, *Bootstrap confidence intervals for population mean in the case of asymmetric distributions of random variables* and *On some confidence intervals for population mean in case of asymmetric distributions of random variables;* Maria Czogała, *On the properties of some predictor in time series analysis;* Wojciech Gamrot, *On some composite estimator of the population mean*; Tomasz Jurkiewicz, *Correlation among variables and methods of establishing weights of sample units. Monte Carlo analysis of the modified synthetic estimator;* Małgorzata Kobylińska and Wiesław Wagner, *Bootstrap confidence regions based on the Mahalanobis depth measure of two-dimensional samples;* Daniel Kosiorowski, *About robust detection of a change – point in selected linear regression models;* Andrzej Mantaj and Wiesław Wagner, *Estimation of parameters of Törnquist's functions with Newton – Raphson's method;* Dorota Pruska, *Dispersion of estimates of linear regression parameters for the deepest regression method;* Krystyna Pruska, *Similarity of small area relative frequency distributions in small area synthetic estimation;* Janusz Wywiał, *Performing quantiles in multiple regression sampling strategy;* Tomasz Żądło, *On accuracy of some EBLU predictors of domain total.*

Hypothesis testing is presented in the following works: Tadeusz Bednarski and Filip Borowicz, *On robust inference for the Cox model – the coxrobust package*; Czesław Domański, *Power of tests for multivariate normality based on skewness and flatness coefficients;* Grzegorz Kończak, *On testing the hypothesis*

of stability of the ratio of two random variables; Dariusz Parys, *The modification of stepwise multiple procedure;* Krystyna Pruska, *Sensitivity of the chi-square fit test to the division of hypothetical set of investigated variable values;* Wiesław Wagner, *Test of multivariate normality using shape measures of distribution;* Wojciech Zieliński, *Goldfeld-quandt test: unbiasedness vs symmetry.*

Section II concentrates on problems touching on the calculus of probability, statistical models and the methods of data classification and cluster analysis.

Multivariate statistical models are presented in the works: Bronisław Ceranka and Małgorzata Graczyk, *Note on the optimum chemical balance weighing design for odd number of objects* i *Optimal designs for $p+1$ objects based on designs for p objects.*

The works by Tadeusz Gerstenkorn and Joanna Gerstenkorn, *Remarks on the generalized probability of the bifuzzy event* and Wiesław Wagner, *Distribution of linear combination of arithmetic mean and median from sample* deal with the theory of the calculus of probability.

The works: Andrzej Dudek, *Kohonen self-organizing maps for symbolic objects;* Eugeniusz Gatnar, *Combining different types of classifiers;* Iwona Kasprzyk, *Visualisation of a two –way contingency table in R* and Marek Walesiak, *Cluster analysis with* `clustersim` *computer program and R environment* deal with data classification.

The works Jan Kalina, *Weighting in the Template matching* and Jerzy Korzeniewski, *Proposal of a new method of choosing starting points for k-means grouping* discuss some cluster analysis problems.

Section III is devoted to the applications of statistical methods in economic, financial and actuarial sciences as well as in agriculture.

Statistical methods in financial market are discussed in the works: Katarzyna Bolonek, *The market as the Minority Game and the statistical physics;* Anna Czapkiewicz and Małgorzata Machowska, *Portfolio construction with modified Sharpe's method;* Krzysztof Jajuga, *Multivariate distributions in financial data analysis – applications in portfolio approach;* Wojciech Sarnowski, *Detection of homogeneous segments in financial time series*; Grażyna Trzpiot, *Multivalued coherent risk measures.*

The applications of multivariate statistical methods in actuarial sciences are discussed in the works: Jacek Białek, *A merger of pension funds – a stochastic model;* Piotr Brylikowski, *The model of risk assessment in light of Solvency II project;* Artur Mikulec, *Applying the RiskGrande measure in the risk analysis and the efficiency of Open Pension Funds;* Anna Szymańska, *Application of bayesian estimators to the estimation of bonus malus coefficients in CR automobile liability insurance.*

Further works deal with the applications of statistics in economic sciences: Jacek Białek and Andrzej Czajkowski, *A proposition of the system of weights for aggregative indexes on the example of the index of work efficiency;* Alicja Ganczarek, *VaR in risk analysis on DAM and models of volatility of variance;* Jan Kubacki, *Application of bayesian estimation methods for small domains in Polish Labor Force Survey;* Eugeniusz Kwiatkowski, *Methodological aspects of labour market research based on the labour force survey in Poland.*

The remaining articles deal with multivariate statistics applications in agriculture and physics: Dorota Bartosińska, *Bayes estimation in agricultural sample surveys in Poland* Marcin Wolter, *How to reconstruct the unknown physical quantities using neural networks.*

Czesław Domański, Anna Szymańska