

Preface of the “Symposium on Statistical tools and models for applications”

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The aim of this session is to focus on statistical tools for applications to real data. The emphasis is in environmental and in health studies, in a broad sense. Methods will be presented to explore trends, identify changes and to model a response variable when some of the standard assumptions fail. Applications of Multivariate Statistical Methods to real data are shown. It will be expected to bring together researchers with interest in these aspects of Statistical analysis and to discuss problems and new ideas.

The topics include, but are not limited to the following:

- Regression Modelling
- Multivariate data analysis
- Time Series Models
- Change-point analysis
- Generalized linear models
- Structural models
- Simulation
- Resampling

You can find below the list of extended abstracts of the talks (and posters) presented in this symposium, which covers a range of topics in applied statistics. We briefly describe the contents of the papers and highlight the presenting author.

- Paper 1, by A. Manuela Gonçalves and Marco Costa. *Assessing the performance of Change-point detection based on the SIC procedure for non Gaussian and correlated data - a simulation study*. The authors explore, through a simulation study, the impact of autocorrelation and non-normality on change-point detection in a time series, when one use the Schwarz Information Criterion (SIC) approach.
- Paper 2, by Raquel Oliveira, A. Manuela Gonçalves, and Rosa M. Vasconcelos. *A negative binomial model for student allocation to higher education in Portugal during the pre-Bologna period*. In this paper the authors use regression analysis applied to count data, by estimating negative binomial models. The focus is to obtain a model for student allocation in the engineering programs of higher education in Portugal during the pre-Bologna period.
- Paper 3, by Helena Mourão. *Ordinal Regression Models to Describe Tourist Satisfaction with Sintra's World Heritage*. The author shows how ordinal regression models are becoming a very powerful tool in modeling the relationship between an ordinal response variable and a set of explanatory variables in tourism research.
- Paper 4, by Marina A. P. Andrade and Hugo F.V. Cardoso. *The Problem of Age Determination in Living Individuals*. In this paper, the authors discuss some methods to estimate age in humans, with the emphasis on their importance and constraints in a globalized world with high mobility.
- Paper 5, by Lucie Dudová, F. Buňka, J. Michálek, M. Sedláčik and L. Buňková. *Risk Analysis of Tyramine Concentration in Food Production*. The authors use generalized regression models including Gompertz curves for modeling microbiological and physicochemical variables.
- Paper 6, by Martina Mikušková, Jaroslav Michálek, Pavel Mikuška, and Todor Ivanov. *Statistical analysis of chemical composition of PM₁ aerosols*. In this paper, the authors use Factor analysis to find common factors, which represent the aerosols emission sources in two cities of the Czech Republic. The solutions and interpretation of factors is discussed.
- Paper 7, by J. A. Lobo Pereira, Maria Cristina Ferreira and Teresa Oliveira. *Assessing Risk Factors for Periodontitis Using Regression*. The authors compare two regression models in order to assess the influence of a set of chosen predictors in the Attachment Loss.

Paper 8, by Maria J. Costa, Mafalda Pires, Cassiano Neves, Delfin Tavares, Alexandra M. Quintas, Ana I. Ferreira, M. J. Espirito Santo, Alexandra Castro, M. Salomé Cabral and João J.F Gomes. *Supracondylar Fracture in Children. Rehabilitation in Occupational Therapy. Yes or No?* The authors used several statistical methodologies to assess the efficacy of a program of occupational therapy.

Paper 9, by M. Rosário Ramos and Clara Cordeiro. *Trend Tests in Time Series with Missing Values: a Case Study with Imputation*. Using two real time series, the authors explore the performance of two trend tests after choosing a specific imputation method.



Maria do Rosário Ramos is an Assistant Professor of Probability and Statistics at Universidade Aberta, Portugal, since 2006 (www.uab.pt).

She completed her PhD in Statistics and Operations Research specialty of Probability and Statistics, at the University of Lisbon(2006), with a thesis entitled "Trend tests with application to water quality assessment: comparison between parametric and non parametric methods", under the supervision of Teresa Alpuim. Her research is conducted mainly in CMAF-Center of Mathematics and Fundamental Applications, University of Lisbon, and her interests are Modeling and Testing in time series, articulated with problems in environmetrics. The collaboration with medical and psychology schools and the supervision of students led to an interest in applications of multivariate methods, as generalized linear models, factor analysis and structural equations models. She is the author or co-author of papers and conference proceedings and has given talks in international conferences, mainly on Statistical Methods and Applications.