



III Congresso Brasileiro de Jovens Pesquisadores  
em Matemática Pura, Aplicada e Estatística

Curitiba, December 12-14, 2018

Session: Métodos Computacionais na Estatística: Teoria e  
Aplicações

Organized by Gabriela B. Cybis (Universidade Federal do Rio Grande do Sul)  
and Guilherme Pumi (Universidade Federal do Rio Grande do Sul)

Schedule

**Wednesday, December 12**

9:00 - 9:30	Opening
9:30 - 10:30	Plenary talk 1
10:30 - 11:00	Coffee break
12:00 - 13:30	Lunch
13:30 - 14:30	Plenary talk 2
16:40 - 17:10	Coffee break
17:10 - 18:40	Round Table

**Thursday, December 13**

- 13:30 - 14:30 Plenary talk 4
- 14:40 - 15:20 Josiane Stein (Instituto Federal Sul-Rio-grandense)  
*Generalized Ornstein-Uhlenbeck Type Processes: Theoretical Properties and Simulation Results*
- 15:20 - 16:00 Eduardo de Oliveira Horta (UFRGS)  
*Conjugate Processes: Theory and Application to Risk Forecasting*
- 16:00 - 16:40 Katiane Silva Conceição (USP)  
*Biparametrics  $k$ -Modified Power Series Distributions: A Bayesian Approach*
- 16:40 - 17:10 Coffee break
- 17:10 - 17:50 Márcia Helena Barbian (UFRGS)  
*Spatial subsemble estimator for large geostatistical data*
- 17:50 - 18:30 José Luiz Padilha da Silva (UFPR)  
*A General GEE Framework for the Analysis of Longitudinal Ordinal Missing Data and Related Issues*
- 20:00 - 0:00 Social dinner

**Friday, December 14**

- 9:00 - 10:00 Plenary talk 5
- 10:00 - 10:30 Coffee break
- 13:30 - 14:30 Plenary talk 6
- 16:40 - 17:10 Coffee break
- 17:10 - 18:40 Assembly

## Abstracts

1. *Speaker:* **Josiane Stein***Affiliation:* Instituto Federal Sul-Rio-Grandense - Câmpus Sapiranga*Title:* ***Generalized Ornstein-Uhlenbeck Type Processes: Theoretical Properties and Simulation Results***

We study a class of continuous-time stochastic process that generalizes the Ornstein-Uhlenbeck processes. We call this class as Generalized Ornstein-Uhlenbeck Type Process and denote it by GOU type process. Symmetric  $\alpha$ -stable Lévy process is the class of noise process considered in this work. We present examples derived from the GOU type process. Some of them illustrate their basic properties as well as some time series realizations. We also present their theoretical and normalized codifference functions when the process has infinite second moment. The spectral covariance function is another alternative dependence measure considered here. The maximum likelihood estimation procedure is proposed to estimate both the parameters of the process arising from the classical Langevin equation, i.e., the Ornstein-Uhlenbeck process, and the parameters of the so-called Cosine process, a particular one in the class of GOU type processes.

2. *Speaker:* **Eduardo de Oliveira Horta***Affiliation:* UFRGS*Title:* ***Conjugate Processes: Theory and Application to Risk Forecasting***

Many dynamical phenomena display a cyclic behavior, in the sense that time can be partitioned into units within which distributional aspects of a process are homogeneous. In this paper, we introduce a class of models - called conjugate processes - allowing the sequence of marginal distributions of a cyclic, continuous-time process to evolve stochastically in time. The connection between the two processes is given by a fundamental compatibility equation. Key results include Laws of Large Numbers in the presented framework. We provide a constructive example which illustrates the theory, and give a statistical implementation to risk forecasting in financial data.

3. *Speaker:* **Katiane Silva Conceição***Affiliation:* ICMC/USP*Title:* ***Biparametrics  $k$ -Modified Power Series Distributions: A Bayesian Approach***

This paper presents a Bayesian approach by considering a reference prior for estimating the parameters of biparametric  $k$ -modified power series ( $k$ -MPS) distributions. The  $k$ -MPS distribution is an extension of the power series (PS) distribution family, allowing it to be adjusted to count data without previous knowledge of frequency of  $k$  observations in the sample (e.g.,  $k$ -inflated or  $k$ -deflated datasets). Simulation studies are presented in order to illustrate the performance of the proposed methodology. Applications of the proposed methodology involve the analysis of real datasets.

4. *Speaker:* **Márcia Helena Barbian***Affiliation:* UFRGS*Title:* ***Spatial subsemble estimator for large geostatistical data***

Um problema que vem se tornando habitual em análise geoestatística é a quantidade crescente de observações, em tais casos é comum que estimadores usualmente utilizados não possam ser empregados devido a dificuldades numéricas. Nesse trabalho, é proposto um novo estimador para massivas observações em geoestatística: o estimador subsemble espacial. O estimador subsemble espacial seleciona várias subamostras espacialmente estruturadas do conjunto de dados, cada subamostra estima com facilidade os parâmetros do modelo e as estimativas resultantes são ponderadas através de um subconjunto de validação. Em estudos simulados e em uma aplicação à dados ambientais é possível avaliar que o método proposto é rápido e acurado.

5. *Speaker:* **José Luiz Padilha da Silva***Affiliation:* UFSM*Title:* ***A General GEE Framework for the Analysis of Longitudinal Ordinal Missing Data and Related Issues***

Generalized Estimation Equations (GEE) are a well-known method for the analysis of categorical longitudinal data. This method presents computational simplicity and provides consistent parameter estimates that have a population-averaged interpretation. However, with missing data, the resulting parameter estimates are consistent only under the strong assumption of missing completely at random (MCAR). Some corrections can be done when the missing data mechanism is missing at random (MAR): inverse probability weighting (WGEE) and multiple imputation (MIGEE). A recent method combining ideas of these two approaches has a doubly robust property in the sense that one only needs to correctly specify the weight or the imputation model in order to obtain consistent estimates for the parameters. In this work, a proportional odds model is assumed and a doubly robust estimator is proposed for the analysis of ordinal longitudinal data with intermittently missing responses and covariates under the MAR mechanism. In addition, the association structure is modeled by means of either the correlation coefficient or local odds ratio. The performance of the proposed method is compared to both WGEE and MIGEE through a simulation study. The method is applied to a data set related to Rheumatic Mitral Stenosis.