

3rd Workshop on Probabilistic and Statistical Methods

February 9-11, 2015
ICMC/USP, São Carlos, SP, Brazil

Invited Speakers

Emmanuel Lesaffre
Katholieke Universiteit Leuven, Belgium

Hélio dos Santos Migon
Universidade Federal do Rio de Janeiro (UFRJ)

José Galvão Leite
Universidade Federal de São Carlos (UFSCar)

Julio da Motta Singer
Instituto de Matemática e Estatística (IME/USP)

Manuel Galea Rojas
Pontificia Universidad Católica de Chile, Chile

Nancy Lopes Garcia
Instituto de Matemática, Estatística e
Computação Científica (IMECC/UNICAMP)

Minicourses

Dependence Analysis via Copulas
Nikolai Kolev, Leandro A. Ferreira e Rafael Aguilera
(Instituto de Matemática e Estatística - IME/USP)

Data Mining
Yoav Bergner
(Educational Testing Service, Princeton, NJ, USA)

Scientific Committee

Alexsandro Giacomo Grimbert Gallo
Universidade Federal do Rio de Janeiro (UFRJ)

Alina A. von Davier
Educational Testing Service, Princeton, NJ, USA

Francisco Louzada Neto
Instituto de Ciências Matemáticas e de Computação (ICMC/USP)

Victor Hugo Lachos Dávila
Instituto de Matemática, Estatística e
Computação Científica (IMECC/UNICAMP)

Organizing Committee

Gustavo Henrique de Araujo Pereira
Universidade Federal de São Carlos (UFSCar)

Márcio Alves Diniz
Universidade Federal de São Carlos (UFSCar)

Mariana Curi
Instituto de Ciências Matemáticas e de Computação (ICMC/USP)

Mário de Castro
Instituto de Ciências Matemáticas e de Computação (ICMC/USP)

Activities include invited plenary sessions,
short talks, one poster session
and two minicourses.

Further information and registration: <http://estatisticaverao.icmc.usp.br/>

ORGANIZED BY

Programa Interinstitucional de Pós-graduação em Estatística - PIPGEs



Departamento de Matemática
Aplicada e Estatística
Instituto de Ciências Matemáticas e de Computação
Universidade de São Paulo - USP



Departamento de Estatística
Universidade Federal de São Carlos - UFSCar

SPONSORED BY



3rd Workshop on Probabilistic and Statistical Methods

February 9–11, 2015

ICMC/USP, São Carlos, SP, Brazil

PROGRAM

ICMC/USP and DEs/UFSCar

Organized by



Departamento de Matemática Aplicada e Estatística – SME
Instituto de Ciências Matemáticas e de Computação – ICMC
Universidade de São Paulo – USP



Departamento de Estatística – DEs
Universidade Federal de São Carlos – UFSCar

Sponsored by



Associação Brasileira de Estatística



Fundação Coordenação de Aperfeiçoamento
de Pessoal de Nível Superior



Conselho Nacional de Desenvolvimento
Científico e Tecnológico



Fundação de Amparo à Pesquisa
do Estado de São Paulo

About the 3rd Workshop on Probabilistic and Statistical Methods

ICMC/USP, São Carlos, SP, Brazil

February 9–11, 2015

The Workshop on Probabilistic and Statistical Methods is an initiative of the Programa Interinstitucional de Pós-graduação em Estatística (PIPGEs ICMC/USP and UFSCar), which brings together the Statistics and Probability research groups from ICMC/USP and UFSCar, in São Carlos, SP, Brazil.

This meeting intends to discuss new developments in Statistics, Probability and their applications. Activities include invited plenary sessions, short talks, a poster session and two short courses. The topics of this meeting include Probability and Stochastic Processes, Statistical Inference, Regression Models, Survival Analyses and Complex Stochastic Systems. The aim of the workshop is to provide a unique opportunity for researchers and students to exchange experiences and start collaborations.

Invited Speakers

Emmanuel Lesaffre, Katholieke Universiteit Leuven, Belgium

Helio dos Santos Migon, UFRJ, Brazil

Julio da Motta Singer, USP, Brazil

Luis Ernesto Bueno Salazar, UFSCar, Brazil

Manuel Galea, Pontificia Universidad Católica de Chile, Chile

Nancy Lopes Garcia, UNICAMP, Brazil

Minicourses

Nikolai Kolev and Rafael Aguilera, USP, Brazil

Yoav Bergner, Educational Testing Service, USA

Scientific Committee

Alexsandro Giacomo Grimbirt Gallo, UFRJ, Brazil

Alina A. von Davier, Educational Testing Service, USA

Francisco Louzada Neto, USP, Brazil

Víctor Hugo Lachos Dávila, UNICAMP, Brazil

Organizing Committee

Gustavo Henrique de Araujo Pereira, UFSCar

Márcio Alves Diniz, UFSCar (chair)

Mariana Cúri, ICMC/USP

Mário de Castro, ICMC/USP (chair)

3rd Workshop on Probabilistic and Statistical Methods

February 9–11, 2015

ICMC/USP, São Carlos, SP, Brazil

SCHEDULE

ICMC/USP and DEs/UFSCar

3rd Workshop on Probabilistic and Statistical Methods
February 9-11, 2015 – ICMC/USP, São Carlos, SP, Brazil

	Monday (Feb 9 th)	Tuesday (Feb 10 th)	Wednesday (Feb 11 th)
7h20 - 8h20	Registration		
8h20 - 9h20	MC ₁	MC ₁	P ₅
9h20 - 10h20			ST ₂
10h20 - 10h40	Coffee break	Coffee break	Coffee break
10h40 - 11h00	Opening	Poster session	P ₆
11h00 - 11h40	P ₁		
11h40 - 12h00			Close
12h00 - 14h00	Lunch	Lunch	
14h00 - 16h00	MC ₂	MC ₂	
16h00 - 16h20	Coffee break	Coffee break	
16h20 - 17h20	P ₂	P ₃	
17h20 - 18h20	ST ₁	P ₄	

MC: minicourses, P: plenary talks and ST: short talks

MC₁: Yoav Bergner – Data mining

MC₂: Nikolai Kolev and Rafael Aguilera – Dependence analysis via copulas

P₁: Nancy Lopes Garcia – Rumor processes on \mathbb{N} and discrete renewal processes

P₂: Luis Ernesto Bueno Salazar – The sticker collector’s problem in the classroom

P₃: Emmanuel Lesaffre – Mixed-effects transition models to predict hemoglobin in blood donors

P₄: Helio dos Santos Migon – The Bayesian bridge with reference prior

P₅: Francisco Louzada Neto – Statistical products and innovation

P₆: Julio da Motta Singer – Parametric joint modelling of longitudinal and survival data

ST₁: 1. Alejandro C. Frery, Raydonal Ospina and Luis Gómez Déniz – An approach for finding structures in ratio images, 2. Manuel Galea – Estimation in functional linear relationships with replications and 3. Breno Silveira de Andrade and Marinho Gomes Andrade – GARMA models for counting data: an application on financial time series

ST₂: 1. Karina Bindandi Emboaba de Oliveira, Cristian Coletti and Pablo Rodríguez – A spatial stochastic model for two-stage innovation diffusion, 2. Helio dos Santos Migon – Dynamic models for the k -parametric exponential family: fast computational approaches and 3. Emmanuel Lesaffre – Fast linear mixed model computations for GWAS with longitudinal data

Poster session: 20 presentations

Conferences

1. Emmanuel Lesaffre, Katholieke Universiteit Leuven, Belgium
Mixed-effects transition models to predict hemoglobin in blood donors
2. Helio dos Santos Migon, UFRJ, Brazil
The Bayesian bridge with reference prior
3. Luis Ernesto Bueno Salasar
The sticker collector's problem in the classroom
4. Julio da Motta Singer, USP, Brazil
Parametric joint modelling of longitudinal and survival data
5. Francisco Louzada Neto, USP, Brazil
Statistical products and innovation
6. Nancy Lopes Garcia, UNICAMP, Brazil
Rumor processes on \mathbb{N} and discrete renewal processes

Minicourses

1. Nikolai Kolev and Rafael Aguilera, USP, Brazil
Dependence analysis via copulas
2. Yoav Bergner, Educational Testing Service, USA
Data mining

Oral Communications

1. Emmanuel Lesaffre, Katholieke Universiteit Leuven, Belgium
Fast linear mixed model computations for GWAS with longitudinal data
2. Helio dos Santos Migon, UFRJ, Brazil
Dynamic models for the k -parametric exponential family: fast computational approaches
3. Manuel Galea, Pontificia Universidad Católica de Chile, Chile
Estimation in functional linear relationships with replications
4. Alejandro C. Frery, Raydonal Ospina and Luis Gómez Déniz
UFAL, Brazil, UFPE, Brazil and Universidad de Las Palmas de Gran Canaria, Spain
An approach for finding structures in ratio images

5. Breno Silveira de Andrade and Marinho Gomes Andrade
PIPGEs UFSCar ICMC/USP and ICMC/USP, Brazil
GARMA models for counting data: an application on financial time series
6. Karina Bindandi Emboaba de Oliveira, Cristian Coletti and Pablo Rodríguez
CCMC ICMC/USP, UFABC and ICMC/USP, Brazil
A spatial stochastic model for two-stage innovation diffusion

Poster Session

1. Glauber Márcio Silveira Pereira and Carlos Alberto Ribeiro Diniz
PIPGEs UFSCar ICMC/USP and UFSCar, Brazil
Modelo transmutado logístico II
2. Danielle Gonçalves de Oliveira Prado, Devanil Jaques de Souza and Lucas Monteiro Chaves, UFLA, Brazil
The chi-square test via marginal at the diagonal to check goodness-of-fit for bivariate copulas
3. Juliana Scudilio Rodrigues and Gustavo H. A. Pereira
PIPGEs UFSCar ICMC/USP and UFSCar, Brazil
Propriedades do resíduo quantílico em modelos de regressão gama
4. Dante Reynaldo Baldeon Molleda and Ricardo Sandes Ehlers
PIPGEs UFSCar ICMC/USP and ICMC/USP, Brazil
Estimação bayesiana do modelo GARCH(1,1) com inovações t -Student
5. Marcelo Andrade da Silva and Luzia Trinca, UNESP, Brazil
Controlling for high leverages in optimum factorial designs
6. Amélia Milene Correia Fernandes and Marinho Gomes Andrade
PIPGEs UFSCar ICMC/USP and ICMC/USP, Brazil
Abordagens clássica e bayesiana nos modelos com respostas binárias
7. Lorena Y. Cáceres Tomaya and Mário de Castro
PIPGEs UFSCar ICMC/USP and ICMC/USP, Brazil
Inference based on maximum penalized likelihood in measurement error models
8. Amanda Morales Eudes and Vera Lucia Damasceno Tomazella
PIPGEs UFSCar ICMC/USP and UFSCar, Brazil
Família Kumaraswamy generalizada com fração de cura
9. Daiane Aparecida Zuanetti and Luis Aparecido Milan
PIPGEs UFSCar ICMC/USP and UFSCar, Brazil
Generalized mixture model with model selection

10. Amanda Buosi Gazon, Luis Ernesto Bueno Salasar and Adriano Polpo de Campos
PIPGEs UFSCar ICMC/USP, UFSCar and UFSCar, Brazil
A statistical approach to the analysis of human gait
11. Lia Hanna Martins Morita and Vera Lúcia Damasceno Tomazella
UFMT & PIPGEs UFSCar ICMC/USP and UFSCar, Brazil
The inverse Gaussian process for time-dependent structural reliability analysis
12. Roberta de Souza and Carlos Alberto Ribeiro Diniz
PIPGEs UFSCar ICMC/USP and UFSCar, Brazil
Modelo de regressão para dados com distribuição geométrica correlacionada
13. Eveliny Barroso da Silva and Carlos Alberto Ribeiro Diniz
UFMT & PIPGEs UFSCar ICMC/USP and UFSCar, Brazil
Modelo de regressão binomial negativa com erro de medida
14. Fernando Nascimento and Jeremias Leão
UFPI and UFPI & PIPGEs UFSCar ICMC/USP, Brazil
A numerical analysis of the extended generalized extreme value distribution
15. Nicholas Wagner Eugenio and Adriano Polpo de Campos
PIPGEs UFSCar ICMC/USP and UFSCar, Brazil
Regression via transform-both-sides model
16. José Clelto Barros Gomes, Victor Fossaluzza and Cibele Maria Russo
PIPGEs UFSCar ICMC/USP, IME/USP and ICMC/USP, Brazil
Bayesian analysis of linear mixed-effects models for cortisol data
17. Rosineide F. da Paz, Jorge Luis Bazán and Luis A. Milan
PIPGEs UFSCar ICMC/USP, ICMC/USP and UFSCar, Brazil
A simplex mixture model: an application to human development index
18. George Lucas M. Pezzott, José Galvão Leite and Luis Ernesto B. Salasar
PIPGEs UFSCar ICMC/USP, UFSCar and UFSCar, Brazil
Estimativa de máxima verossimilhança do tamanho populacional a partir de um modelo de captura-recaptura com heterogeneidade
19. Carolina Costa Mota Paraíba and Carlos Alberto Ribeiro Diniz, UFSCar, Brazil
Modelo beta não linear truncado misto tratado sob o enfoque bayesiano
20. Mauro Ribeiro de Oliveira Júnior and Francisco Louzada Neto
CEF & PIPGEs UFSCar ICMC/USP and ICMC/USP, Brazil
Statistical tools underlying the credit risk (dependence) models in Basel II agreements

3rd Workshop on Probabilistic and Statistical Methods

February 9–11, 2015

ICMC/USP, São Carlos, SP, Brazil

ABSTRACTS

ICMC/USP and DEs/UFSCar

Minicourse 1

Data Mining

Yoav Bergner, Educational Testing Service, Princeton, NJ, USA

Abstract What does big data really mean? It depends! This mini-course will introduce some of the challenges and solutions with applications to educational process data from tutoring systems, online courses, simulations, and educational games. As much as possible, software references will focus on R packages, though we will also briefly describe alternate pathways using Python, Weka, and RapidMiner. The goal is to familiarize the participants with some of the tools and methods available, with appropriate expectations.

Outline

- Psychometrics *versus* EDMA.
- Overview of data mining tools for classification and clustering.
- Data logging, cleaning, and visualization.

References

1. Conway, D. and White, J. Machine Learning for Hackers, O'Reilly Media, 2012
2. Steinley, D. (2006). K-means clustering: A half-century synthesis. *British Journal of Mathematical and Statistical Psychology*, 59, 1–34
3. Strobl, C., Malley, J. and Tutz, G. (2009). An introduction to recursive partitioning: rationale, application, and characteristics of classification and regression trees, bagging, and random forests. *Psychological Methods*, 14, 323–348
4. Witten, I. H. and Frank, E. Data Mining: Practical Machine Learning, Tools and techniques, Morgan Kaufmann, 2005
5. Zhao, Y (2011) RDataMining.com: R and Data Mining. RDM, Canberra. <http://www.rdatamining.com/>

Minicourse 2

Dependence Analysis via Copulas

Nikolai Kolev and Rafael Aguilera, USP, Brazil

Abstract We will introduce the copula approach for dependence analysis of random variables. Recent techniques will be presented along with the corresponding R codes.

Outline

- Copula theory: basic properties and copula families.
- Dependence concepts: concordance, perfect dependence (comonotonicity) and measures of monotone dependence (Spearman, Kendall, Gini and Blets).
- Statistical inference using copulas.
- Applications using R codes.

Remark. The second part of the course will be practical, so please download the R programme to your laptop.

References

1. Balakrishnan, B. and Lai, C. Continuous Bivariate Distributions, 2nd ed., Springer, 2009
2. Joe, H. Multivariate Models and Dependence Concepts, Chapman and Hall, 1997
3. Nelsen, R. An Introduction to Copulas, 2nd ed. Springer, 2006

Conferences

Mixed-effects transition models to predict hemoglobin in blood donors

Emmanuel Lesaffre

Katholieke Universiteit Leuven, Belgium

Abstract Blood donors experience a temporary reduction in their hemoglobin (Hb) value after donation. In each visit to the blood bank, the Hb value is measured, and a too low Hb value leads to a deferral for donation. Due to the recovery process after each donation, as well as state dependence and unobserved heterogeneity, longitudinal data of Hb values of blood donors provide unique statistical challenges. To estimate the shape and duration of the recovery process, and to predict future Hb values a mixed-effect transition model can be employed.

In a mixed-effect transition model, random effects are incorporated in a transition model, which is quite common to do in the econometric literature but is less popular in the biostatistical literature. Since at least one of the covariates is related to the random structure it is important to take into account that correlation. This is called the initial conditions problem, again not commonly considered in the biostatistical literature.

Various models were applied to the blood donor data to predict Hb, such as (i) a mixed-effects models, (ii) a latent-class mixed-effects model, and (iii) a latent-class mixed-effects transition model. In each model, a flexible function was used to model the recovery process after donation. The latent classes identify groups of donors with fast or slow recovery times, and donors whose recovery time increases with the number of donations. The transition effect accounts for possible state dependence in the observed data. All models were estimated in a Bayesian way, using data of 500 donors from the Donor InSight study. Informative priors were used for parameters of the recovery process that were not identified using the observed data, based on results obtained from the literature. The results show that the latent-class mixed-effects transition model fits the data best, which illustrates the importance of modeling state dependence, unobserved heterogeneity, and the recovery process after donation. The estimated recovery time is much longer than the current minimum interval between donations, suggesting that an increase of this interval may be warranted.

References

Using dynamic regression and random effects models for predicting hemoglobin levels

in novel blood donors

K. Nasserinejad, W. de Kort, M. Baart, A. Komarek, J. van Rosmalen, E. Lesaffre
BMC Medical Research Methodology, 2013, 13:62

Piecewise transition models with random effects for unequally-spaced longitudinal measurements

R. Rikhtehgaran, I. Kazemi, G. Verbeke, W. de Kort and E. Lesaffre
Statistical Modelling, 2012, 12, 503–527

Prediction of hemoglobin in blood donors using a latent class mixed-effects transition model

K. Nasserinejad J. van Rosmalen, W. de Kort, D. Rizopoulos and E. Lesaffre (submitted)

Statistical products and innovation

Francisco Louzada Neto
USP, Brazil

Abstract In this conference I present the main statistical products that have been developed for the Group of Risk Assessment at the Centre for Mathematical Sciences Applied to Industry (CEPID-CeMEAI), based at ICMC, to approximate the academy, the productive sector and the population in general in Brazil.

The Bayesian bridge with reference prior

Helio dos Santos Migon
UFRJ, Brazil

Abstract Our aim in this talk is to present some new developments in the context of regularized regression. We are mainly concerned with the development of a full Bayesian bridge regression using objective analysis. The extension of the objective bridge prior to deal with multivariate regression models is also pointed out. The Bayesian bridge, a natural extension of the “lasso” prior, is based on an exponential prior distribution represented in a hierarchical setup. A reference prior distribution for the parameters of the highest level of the hierarchy is developed. Results from a large simulation study of the order selection in an autoregressive model are presented. Joint work with Larrisa Alves

Parametric joint modelling of longitudinal and survival data

Julio da Motta Singer
USP, Brazil

Abstract We consider parametric joint modelling of longitudinal measurements and survival times, motivated by a study conducted at the Heart Institute (Incor), São Paulo, Brazil with the objective of evaluating the impact of B-type Natriuretic Peptide (BNP) collected at different instants on the survival of patients with congestive heart failure (CHF). We employ a linear mixed effects model for the longitudinal response and a Birnbaum-Saunders model for the survival times, extending some existing approaches to accommodate subjects without longitudinal observations. We derive the maximum likelihood estimators of the model parameters and consider their statistical properties. We also conduct a simulation study to evaluate the robustness of the proposed model with respect to misspecification of the parametric distribution for the survival response and to compare the dynamic predictions of survival probabilities with the true values obtained from the model. Finally, the proposed joint model is applied to the cohort of 1609 patients with CHF, of which 1080 have no BNP measurements. The parameter estimates and their standard errors obtained via i) the traditional approach, where only individuals with at least one measurement of the longitudinal response are included and ii) the proposed approach, which includes survival information of all individuals are compared with those obtained via marginal (longitudinal and survival) models. The results suggest that an increase in the number of subjects with measurements of the longitudinal response can improve the evidence of the association between the longitudinal and survival responses and can lead to an increase in the precision of parameter estimates. Furthermore, we conclude that an increase in the number of observations of the longitudinal response collected on a subject can improve the quality of survival predictions.
Joint work with Diana C. Franco-Soto and Antonio C. Pedroso-de-Lima

The sticker collector's problem in the classroom

Luis Ernesto Bueno Salasar
UFSCar, Brazil

Abstract This work discusses how a generalization of the coupon collector's problem can be used in different undergraduate courses as a motivating example and to illustrate important results of probability theory.

Three different solutions are discussed: a Monte Carlo simulation procedure, a survival function and a recursive solution. The methods are applied to calculate how many packages are needed to complete the 2014 World Cup Stickers Collection.

Rumor processes on \mathbb{N} and discrete renewal processes

Nancy Lopes Garcia
UNICAMP, Brazil

Abstract We study two rumor processes on \mathbb{N} , the dynamics of which are related to an SI epidemic model with long range transmission. Both models start with one spreader at site 0 and ignorants at all the other sites of \mathbb{N} , but differ by the transmission mechanism. In one model, the spreaders transmit the information within a random distance on their right, and in the other the ignorants take the information from a spreader within a random distance on their left. We obtain the probability of survival, information on the distribution of the range of the rumor and limit theorems for the proportion of spreaders. The key step of our proofs is to show that, in each model, the position of the spreaders on \mathbb{N} can be related to a suitably chosen discrete renewal process.

Oral Communications

Fast linear mixed model computations for GWAS with longitudinal data

Emmanuel Lesaffre

Katholieke Universiteit Leuven, Belgium

Abstract Recent genome-wide association studies are directed to identify single nucleotide polymorphisms (SNPs) associated with longitudinally measured traits. In our motivating data set, the bone mineral density (BMD) of more than 5000 elderly individuals was measured at 4 occasions over a period of 12 years. We are interested in SNPs that influence the change of BMD over time. This could be done by fitting a linear mixed model with covariates age, gender, etc but also including each of the SNPs at a time. However, fitting 2.5 million of linear mixed models (1 model per SNP) on a single desktop would take more than a month.

Dealing with such prohibitively large computational time, it is desirable to develop a fast technique. We explored a variety of fast computational procedures. The best approximating procedure is based on a conditional two-step (CTS) approach. This approach approximates the P-value for the SNP-time interaction term from the linear mixed model analysis. Our method is based on the concept of a conditional linear mixed model proposed by Verbeke et al. (2001). A simulation study shows that this method has the highest accuracy of all considered approximations. In fact the P-value obtained by our approach is a close approximation of the P-value obtained by fitting a classical linear mixed model. Applying the CTS approach reduced the computational time needed to analyze the BMD data to 5 hours. Optimizing the R-codes further reduced the computation time to about 10 minutes, thus a huge gain in computation time is obtained.

For the balanced case we were able to obtain some insightful results. For the unbalanced case a simulation study showed the excellent performance of our proposed procedure. More specifically, we have explored the robustness of the CTS against different simulation parameters such as sample size, number of measurements, variance-covariance parameters etc. We have also explored the performance of the CTS in case of more complicated residual errors structure (autocorrelation, heteroscedasticity).

References

Fast linear mixed model computations for genome-wide association studies with longitudinal data

K. Sikorska, F. Rivadeneira, P.J.F. Groenen, A. Hofman, A.G. Uitterlinden, P.H.C. Eilers and E. Lesaffre
Statistics in Medicine, 2013, 32, 1, 165-180, DOI: 10.1002/sim.5517

Conditional linear mixed models
G. Verbeke, B. Spiessens, E. Lesaffre
The American Statistician, 2001, 55, 1, 25-34

Dynamic models for the k -parametric exponential family: fast computational approaches

Helio dos Santos Migon
UFRJ, Brazil

Abstract In this work we extend the class of generalized dynamic models for the k -parametric exponential family, univariate and multivariate. The focus is on fast computational approach based on partial specified models using linear Bayes estimation, Laplace approximation and Gauss Hermite quadrature. The multiple link functions introduce a dimensional conflict between the linear predictor and the natural parameters spaces. One possible strategy to sort out this incompatibility is the generalized method of moments, which is being used successfully. Some extensive simulation results are presented for different members of the exponential family and two illustrations for data defined in the interval $(0,1)$ are presented. One refers to unemployment in Brazil and the other to some UK economic data. Other aspect of dynamic modeling included, in our current research agenda, is structural break assessment, both in univariate and multivariate models. Various classes of shrinkage hierarchical prior distributions are implemented and compared with. In particular, we explore models that assume a Student- t distribution in the observational level or in the prior distribution of the location parameter of the observations. The proposed methods are efficient to detect structural changes as shown in an example using economic Brazilian data for the recent years.

This work is still in progress and it is joint with Mariana Albi, Cristian Cruz, Josiane Cordeiro and Alexandra Schmidt.

Estimation in functional linear relationships with replications

Manuel Galea
Pontificia Universidad Católica de Chile, Chile

Abstract In this work we investigate maximum likelihood estimation in linear functional relationships with replications. Maximum likelihood estimation in the presence

of incidental parameters is considered. Since the approach allows the derivation of the asymptotic covariance matrix of the maximum likelihood estimators of the model parameters, it is possible to compute the asymptotic relative efficiencies of the maximum likelihood estimators with respect to the moments estimators. Finally, we apply the methodology to real data and also perform a simulation study to compare the performance of estimators in finite samples.

An approach for finding structures in ratio images

Alejandro C. Frery, Raydonal Ospina and Luis Gómez Déniz
UFAL, Brazil, UFPE, Brazil and Universidad de Las Palmas de Gran Canaria,
Spain

Abstract Synthetic Aperture Radar (SAR) images play a central role in Remote Sensing applications due to, among other important features. These images are the source of relevant information in many applications as, for instance, climate change research. SAR images are affected from a granular contamination. There has been numerous advances in the development of models and techniques for combating speckle and, along with such proposals, in the use of suitable measures of quality for the assessment and comparison of the procedures.

We propose quantitatively measuring the quality of a filter by the criterion of lack of structure in the ratio image it produces. In this work we propose the use of Haralick's textural features [R. M. Haralick, K. Shanmugam, and I. Dinstein, Textural features for image classification, IEEE Transactions on Systems, Man and Cybernetics, vol. SMC-3, no. 6, pp. 610–621, 1973] for the identification of remaining structures in ratio images.

GARMA models for counting data: an application on financial time series

Breno Silveira de Andrade and Marinho Gomes Andrade
PIPGEs UFSCar ICMC/USP and ICMC/USP, Brazil

Abstract Generalized autoregressive moving average (GARMA) models are a class of models that was developed for extending the univariate Gaussian ARMA time series model to a flexible observation-driven model for non-Gaussian time series data. This work presents MLE approach for GARMA models with Poisson and negative binomial distributions models used to adjust counting time series. We tested the asymptotic properties of the likelihood estimator, calculating many metrics. Thus, we used the BIC as classic selection criterion, to select the best model and the best order. We carried out an extensive simulation study, followed by a real data set study with number of financial transactions in 30 minutes series.

A spatial stochastic model for two-stage innovation diffusion

Karina Bindandi Emboaba de Oliveira, Cristian Coletti and Pablo Rodríguez
CCMC ICMC/USP, UFABC and ICMC/USP, Brazil

Abstract We consider an interacting particle system representing the spread of an innovation by agents on the d -dimensional integer lattice. Each agent of population may be in any of the three states belonging to the set $\{0, 1, 2\}$. In this model, 0 stands for ignorant, 1 for aware and 2 for adopter. An aware or an adopter tells about the innovation to any of its (nearest) ignorant neighbors at rate λ . At rate α an aware becomes an adopter due to the action of other (nearest neighbor) adopters. Finally, awares and adopters forget the information at rate one. The arguments, that allow to obtain sufficient conditions under which the innovation either becomes extinct or survives with positive probability, were studied. This involves the study of percolation models and contact process.

Posters

Modelo transmutado logístico II

Glauber Márcio Silveira Pereira and Carlos Alberto Ribeiro Diniz
PIPGEs UFSCar ICMC/USP and UFSCar, Brazil

Abstract O modelo logístico II descreve uma curva parecida com o modelo normal, simétrica, mas com uma correção em caudas pesadas. Ele tem aplicações interessantes na modelagem, como de doença respiratória obstrutiva crônica sobre o tabagismo e idade, graus de pneumoconiose em minérios de carvão, questões geológicas, hemolítica urêmica dados para as crianças, fenômeno físico-químico, psicológico, o tempo de sobrevivência de pacientes diagnosticados com leucemia, e dados de ganho de peso. Neste trabalho construímos um modelo transmutado logístico II. Com o intuito de melhorar o modelo já conhecido para dados que possuem característica de caudas mais pesadas de forma assimétrica. Um modelo transmutado foi construído através de uma transformação feita em modelo com o intuito de generalizá-lo. Este modelo possui um parâmetro a mais, no caso deste estudo o parâmetro de assimetria.

The chi-square test via marginal at the diagonal to check goodness-of-fit for bivariate copulas

Danielle Gonçalves de Oliveira Prado, Devanil Jaques de Souza and Lucas Monteiro Chaves
UFLA, Brazil

Abstract The objective of this paper is to propose a goodness of fit test, based on chi-squared test on the main (and/or secondary) diagonals marginal, for bivariate copulas. Actually the test restricts its attention to those cells located at the extremes of the considered diagonals, under the hypothesis that it is there that the copulas differ from each other. In order to verify the suitability of the test, we compare the Clayton, Gumbel, Frank and normal families of copulas. All the computations were made with the free software R. In all cases analyzed the proposed test showed good control of type I error. However, there is still a failure when it comes to controlling the rate of type II error, except to differentiate the copula of Clayton and Gumbel families.

Propriedades do resíduo quantílico em modelos de regressão gama

Juliana Scudilio Rodrigues and Gustavo H. A. Pereira
PIPGEs UFSCar ICMC/USP and UFSCar, Brazil

Abstract Modelos de regressão gama são utilizados para ajustar variáveis resposta com suporte no conjunto dos reais positivos e distribuição assimétrica positiva. Se o parâmetro de dispersão da distribuição da variável resposta não varia em função de variáveis preditoras, esses modelos pertencem à classe dos modelos lineares generalizados (MLG). Há diversos trabalhos que estudam as propriedades de vários resíduos utilizados na análise de diagnóstico dos MLG's. No entanto, nenhum desses trabalhos estuda as propriedades do resíduo quantílico nos MLG's. Neste trabalho, foram conduzidos estudos de simulação de Monte Carlo para estudar as propriedades do resíduo quantílico em modelos de regressão gama com parâmetro de dispersão constante. Os resultados sugerem que a distribuição do resíduo quantílico é consideravelmente mais próxima da normal padrão do que a distribuição dos resíduos de Pearson e *deviance* quando o tamanho da amostra é moderado ou grande, mas não quando o tamanho da amostra é pequeno.

Estimação bayesiana do modelo GARCH(1,1) com inovações *t*-Student

Dante Reynaldo Baldeon Molleda and Ricardo Sandes Ehlers
PIPGEs UFSCar ICMC/USP and ICMC/USP, Brazil

Abstract Neste trabalho apresentamos o pacote de R `bayesGARCH` que fornece funções para uma eficaz estimação bayesiana do modelo GARCH(1,1) com inovações *t*-Student. O procedimento de estimação é totalmente automático e, assim, evita a tediosa tarefa de ajuste do algoritmo de amostragem MCMC. O uso do pacote é mostrado em um aplicação empírica para taxas de câmbio log-retornos.

Controlling for high leverages in optimum factorial designs

Marcelo Andrade da Silva and Luzia Trinca
UNESP, Brazil

Abstract For the classic linear model ($Y = X\beta + \epsilon$), an optimum design specifies the design matrix, X , such that some function of interest of the information matrix $M = X'X$ or of its inverse is optimized. These functions, named “criteria functions”, have the purpose of making sure the researcher meets his experimental objectives. Single property functions may produce designs that are too tight and lack robustness to missing data. Thus, we propose to include the H property, as defined below, in the expression of a compound criterion to prevent the inclusion of points in the design that are too influential in the model fitting. A fairly simple measure is based

on the diagonal elements of the $H = X(X'X)^{-1}X'$ matrix. These elements, h_i 's ($i = 1, \dots, n$), are simple measures of the influence of each observation in the fitting of the model. Thus, we propose minimizing $\sum_{i=1}^n (h_i - p/n)^2$ in order to minimize the variability of the h_i 's, turning them as closer to p/n as possible.

Abordagens clássica e bayesiana nos modelos com respostas binárias

Amélia Milene Correia Fernandes and Marinho Gomes Andrade
PIPGEs UFSCar ICMC/USP and ICMC/USP, Brazil

Abstract Este trabalho tem como objetivo estudar o modelo de regressão binária usando as funções de ligação probito, logito e complemento log-log nas abordagens clássica e bayesiana. Através desses estudos mostraremos que podemos usar os critérios AIC e BIC para o caso clássico e os critérios E-AIC e E-BIC para o caso bayesiano para selecionar a função de ligação e verificar se os estimadores obtidos são eficientes. Será apresentada uma análise de um conjunto de dados reais obtidos em Paula (2013), no qual temos interesse em saber se diagnósticos de dengue (1: sim e 0: não) estão associados às seguintes covariáveis: idade, cidade onde mora e nível socioeconômico.

Palavras chave: dados binários; modelo de regressão; inferência bayesiana; inferência clássica.

Inference based on maximum penalized likelihood in measurement error models

Lorena Y. Cáceres Tomaya and Mário de Castro
PIPGEs UFSCar ICMC/USP and ICMC/USP, Brazil

Abstract We develop a methodology for maximum penalized likelihood inference in measurement error models. The methodology is based on the technique proposed by Firth (1993). In these cases, a bias corrected estimator is useful for comparison purposes and may offer appreciable improvements in mean-squared error and standard deviation when compared to usual maximum likelihood estimators. Simulation studies will be carried out to assess the performance of the proposed methodology.

Keywords: large sample inference; penalized likelihood; regression model.

Família Kumaraswamy generalizada com fração de cura

Amanda Morales Eudes and Vera Lucia Damasceno Tomazella

PIPGEs UFSCar ICMC/USP and UFSCar, Brazil

Abstract Em análise de sobrevivência é esperado que todas unidades envolvidas no experimento falhem se acompanharmos o experimento por um longo período de tempo. No entanto, há situações em que uma parcela das unidades não apresentam o evento de interesse mesmo se acompanhados por um longo tempo. Se acompanharmos uma lâmpada, certamente ela falhará, porém um ex-detento pode nunca apresentar recorrência no crime, dizemos que esses indivíduos são imunes, curados ou não suscetíveis ao evento de interesse e, conseqüentemente, sua população possui uma fração de curados. Os modelos tradicionais de sobrevivência não são capazes de captar a fração de cura, assim são necessários modelos estatísticos que incorporam a proporção de curados na população. Neste trabalho abordamos o modelo unificado de longa duração para modelarmos dados de tempo de vida supondo que estes seguem distribuição Kumaraswamy generalizada, vendo com mais detalhes a distribuição Kumaraswamy exponencial, e supomos que as causas competitivas seguem distribuição binomial negativa. O modelo proposto abrange alguns modelos especiais, sendo importante o uso de critérios de seleção de modelos para verificar o que se ajusta melhor à aplicação. A aplicabilidade do modelo foi demonstrada em um conjunto de dados reais sobre divórcio, em que o modelo Kumaraswamy exponencial Bernoulli de longa duração se ajustou melhor aos dados, embora os outros também tenham se ajustado muito bem.

Palavras chave: análise de sobrevivência; distribuição Kumaraswamy generalizada; modelos unificados de longa duração.

Generalized mixture model with model selection

Daiane Aparecida Zuanetti and Luis Aparecido Milan
PIPGEs UFSCar ICMC/USP and UFSCar, Brazil

Abstract We present a generalization of mixture models which includes the usual mixture independent distributions and a mixture of distributions linked by a first order Markov chain. We also propose a model selection procedure which fits the most probable models and provides an *a posteriori* probability for each model. It is a data driven procedure based on MCMC. We present some simulations to illustrate the performance of the method and apply to diabetes data.

A statistical approach to the analysis of human gait

Amanda Buosi Gazon, Luis Ernesto Bueno Salazar and Adriano Polpo de Campos

PIPGEs UFSCar ICMC/USP, UFSCar and UFSCar, Brazil

Abstract The analysis of human gait has great importance in assessing the normality or alteration of the movement of a patient, monitoring the development of a treatment, among other applications. In one of the pioneering studies in which statistically models human gait data, Olshen *et al.* (1989) propose a model of trigonometric regression with random coefficients to obtain confidence bands for the curves of the rotation angles using the bootstrap resampling method. The objective of this work is to obtain a characteristic curve of a given population and build credibility and predictive bands. We propose a hierarchical Bayesian approach and use simulation algorithms of Markov Chain Monte Carlo (MCMC) for the estimation process.

The inverse Gaussian process for time-dependent structural reliability analysis

Lia Hanna Martins Morita and Vera Lúcia Damasceno Tomazella
UFMT & PIPGEs UFSCar ICMC/USP and UFSCar, Brazil

Abstract This work presents a stochastic inverse gaussian process model to account for both sampling and temporal variability associated with a deterioration process. The proposed method is more versatile than the random variable deterioration rate model (RV model) commonly used in the structural reliability literature. We present an intuitive interpretation and a comparison of assumptions associated with the random variable and inverse gaussian process deterioration models. The methodology is illustrated with a simulation study and an application with real dataset in the literature.

Modelo de regressão para dados com distribuição geométrica correlacionada

Roberta de Souza and Carlos Alberto Ribeiro Diniz
PIPGEs UFSCar ICMC/USP and UFSCar, Brazil

Abstract Em análise de dados discretos, a distribuição geométrica é geralmente utilizada quando se tem o interesse em avaliar a quantidade da ausência de determinada característica (frequências de fracassos) até que a presença dela ocorra, ou em determinar qual é a probabilidade de fracasso ou de sucesso nestas circunstâncias. Com a preocupação em considerar a existência de uma relação entre estas ocorrências de fracassos e de sucesso, Kolev *et al.* (2000) propõem a distribuição geométrica correlacionada (ou inflacionada) de dois parâmetros (IGeo(p, r)) como uma extensão da distribuição geométrica clássica de parâmetro p (Geo(p)) pela inclusão do coeficiente de correlação r como um parâmetro adicional. Neste trabalho, um modelo de

regressão para dados com distribuição geométrica correlacionada foi proposto e os parâmetros estimados por maximização da função de verossimilhança via simulação numérica. Uma aplicação do modelo foi feita em dados de pacientes com doença de aorta com o objetivo de avaliar os efeitos de correlação e de seis covariáveis na probabilidade de alta do paciente da UTI dias após ele ter sido submetido a procedimento cirúrgico.

Modelo de regressão binomial negativa com erro de medida

Eveliny Barroso da Silva and Carlos Alberto Ribeiro Diniz
UFMT & PIPGEs UFSCar ICMC/USP and UFSCar, Brazil

Abstract Modelos de regressão são ferramentas estatísticas que relacionam o valor médio da variável de interesse (variável resposta) a uma ou mais covariáveis (variáveis explicativas). Quando a variável de interesse é resultado de uma contagem, o modelo de regressão binomial negativa é uma boa opção para modelar tal variável. Em situações práticas, pode acontecer que uma das covariáveis associadas à variável resposta seja medida com erro. Suponha que X_i seja uma covariável medida com erro e W_i a verdadeira covariável observada no modelo. Nesta situação, existe alguma estrutura que relaciona a covariável observada W_i com a verdadeira covariável não observada X_i . Essa estrutura é usualmente aditiva, $W_i = X_i + \varepsilon_i$, ou multiplicativa, $W_i = X_i \varepsilon_i$, $i = 1, \dots, n$, em que os erros, ε_i , são independentes e identicamente distribuídos. Motivados por um problema prático, assumiremos que a covariável não-observada X_i e o erro associado ε_i , $i = 1, \dots, n$, são variáveis aleatórias positivas com distribuição log-normal. Na literatura, há várias propostas de trabalhos envolvendo o modelo de regressão binomial negativa, sem considerar erro nas covariáveis, alguns destes: El-Basyouny and Sayed (2010), Famoye (2010), Li (2010) e Kim *et al.* (2011).

Neste trabalho, propomos o modelo de regressão binomial negativa com erro de medida multiplicativo log-normal. Alguns métodos de estimação são estudados. Tais métodos têm como princípio a estimação por máxima verossimilhança e pseudo-verossimilhança. Para controlar problemas de identificabilidade do modelo, que é usual em modelos com erros de medida nas variáveis, estimamos a variância do erro de medida via dados replicados. Um estudo de simulação foi feito para ilustrar os resultados das estimações para cada método.

Palavras chave: modelos de regressão binomial negativa; modelos com erros nas covariáveis; método de pseudo-verossimilhança.

A numerical analysis of the extended generalized extreme value distribution

Fernando Nascimento and Jeremias Leão

UFPI and UFPI & PIPGEs UFSCar ICMC/USP, Brazil

Abstract The generalized extreme value (GEV) distribution is a family of continuous probability distributions developed within extreme value theory, which has wide applicability in several areas including hydrology, engineering, science, ecology and finance. In this work, we analyze three extensions of the GEV distribution that incorporate an additional parameter. The parameter estimation of these new distributions is done under the Bayesian paradigm, considering vague priors for the parameters. Exercises of simulations show the efficiency of the proposed models.

Regression via transform-both-sides model

Nicholas Wagner Eugenio and Adriano Polpo de Campos
PIPGEs UFSCar ICMC/USP and UFSCar, Brazil

Abstract A parametric regression model for data with domain in real numbers with a linear median regression function and a transformation in both response and regression parts is presented. This model, called TBS (Transform-Both-Sides), is an adaptation of the original TBS model for survival right-censored data. It has a parameter that handles the potential data asymmetry and supposes that the error's distribution is unimodal and symmetric about zero. The density, distribution, survival and quantile functions of the model will be shown as a Bayesian study of the estimation procedure with five error's distributions (normal, double-exponential, Student's t , Cauchy and logistic). These procedures are implemented in TBSSurvival, an open-source fully documented R package. The use of the package with the necessary adaptations is illustrated and the performance of the model is analysed using simulated data sets and a real one.

Bayesian analysis of linear mixed-effects models for cortisol data

José Clelto Barros Gomes, Victor Fossaluza and Cibele Maria Russo
PIPGEs UFSCar ICMC/USP, IME/USP and ICMC/USP, Brazil

Abstract We consider Bayesian inference in linear mixed-effect models for fourth root of cortisol data. The estimation of the parameters was performed by using the Gibbs sampler of “R2jags” in R package. The main interest is comparing the cortisol measurements along time after waking up between the groups: children living in the street and children who do not live in the street. Two models are fitted to the data, one considering only the effect of time after waking up and another model by adding the group effect more interaction between time to wake up and groups. Using credible

intervals, it is possible to conclude that there is no difference in fourth root of cortisol measurements between the groups.

A simplex mixture model: an application to human development index

Rosineide F. da Paz, Jorge Luis Bazán and Luis A. Milan
PIPGEs UFSCar ICMC/USP, ICMC/USP and UFSCar, Brazil

Abstract Statistical analysis of continuous data observed on the unit interval, as rates or proportions, requires flexible models restricted to $(0, 1)$. This paper deal with an application of a mixture of simplex distribution to the municipal Human Development Index data set considering cities (or towns) of the Northeast region of Brazil comparing with the correspondent Human Development Index of cities of the important São Paulo state in Brazil. A full Bayesian approach is considered in the inference process making use of Gibbs sampling and reversible jump Markov Chain Monte Carlo method.

Estimativa de máxima verossimilhança do tamanho populacional a partir de um modelo de captura-recaptura com heterogeneidade

George Lucas M. Pezzott, José Galvão Leite and Luis Ernesto B. Salasar
PIPGEs UFSCar ICMC/USP, UFSCar and UFSCar, Brazil

Abstract Neste trabalho, consideramos a estimação do número desconhecido de indivíduos em uma população fechada através de um modelo de captura-recaptura com heterogeneidade entre os indivíduos. Suponhamos que os elementos da população sejam divididos em A classes disjuntas, $A \geq 2$, de acordo com sua respectiva probabilidade de captura e que esta heterogeneidade não é observável. Para obtenção das estimativas de máxima verossimilhança, utilizamos o algoritmo EM, para o qual os passos iterativos são obtidos de maneira explícita. O intervalo de confiança para o tamanho populacional foi estimado através de procedimento via reamostragens *bootstrap*. Aplicamos o método proposto em um conjunto de dados reais da literatura.

Modelo beta não linear truncado misto tratado sob o enfoque bayesiano

Carolina Costa Mota Paraíba and Carlos Alberto Ribeiro Diniz

UFSCar, Brazil

Abstract Modelos de regressão truncados surgem em muitas aplicações quando não é possível observar valores da variável resposta acima ou abaixo de certos limites. Neste trabalho, propomos modelos bayesianos de regressão não lineares truncados, assumindo que a variável resposta segue uma distribuição beta truncada e que o seu parâmetro de média é parametrizado por uma função não linear contínua e duas vezes diferenciável de parâmetros desconhecidos e covariáveis. O modelo proposto é formulado considerando a estrutura de modelos bayesianos não lineares mistos para explicar uma possível estrutura de correlação dos dados observados causada pela presença de variabilidade extra devido a efeitos não observáveis. Estimativas bayesianas e intervalos de credibilidade para os parâmetros do modelo proposto são calculados a partir da distribuição *a posteriori* dos parâmetros obtida utilizando um procedimento do tipo MCMC. *Checks* preditivos *a posteriori*, resíduos padronizados bayesianos e uma medida de influência bayesiana são considerados para verificar a adequação do modelo, *outliers* e observações influentes. Para a seleção de modelos, consideramos a soma da log-CPO e uma métrica baseada na abordagem bayesiana de modelo de mistura. Um conjunto de dados de retenção de água no solo é analisado utilizando o modelo proposto.

Statistical tools underlying the credit risk (dependence) models in Basel II agreements

Mauro Ribeiro de Oliveira Júnior and Francisco Louzada Neto
CEF & PIPGEs UFSCar ICMC/USP and ICMC/USP, Brazil

Abstract In this work we present a view of statistical tools underpinning advanced credit risk models adopted by Basel Committee to handle minimum capital standards (Basel, 2004). Its statistical formulation relies on assumptions from Merton structural model that consider a single (systematic) risk factor triggering default and consider a particular (Gaussian) dependence structure on assets and default events. Despite academic efforts presented in several papers dealing with parameters estimation required for Basel II, there is still a remaining lack of understanding about parameters correlations, mainly on correlation between PD and LGD. Several previous papers have showed how models that do not consider this correlation, and directly use the independence assumption from Basel II, may be underestimating the real risk of losses and may eventually result in less capital than needed to absorb unexpected losses. In this sense, we also present a notion of proposed models trying to account the Loss correlation setting, i.e., LGD correlation and PD-LGD correlation.

Registered Participants

Last update: Feb 13, 2015

Adriano Kamimura Suzuki, ICMC/USP
 Aishameriane Venes Schmidt, UFRGS
 Alexandre Hiroshi Watanabe, USP-UFSCar
 Amanda Buosi Gazon, USP-UFSCar
 Amanda Morales Eudes, USP-UFSCar
 Amélia M. Correia Fernandes, USP-UFSCar
 Ana Paula Zerbeto, IME/USP
 Andressa do Carmo Gigante, USP-UFSCar
 Andreza Aparecida Palma, UFSCar
 Breno Silveira de Andrade, USP-UFSCar
 Carlos Eduardo Hirth Pimentel, ICMC/USP
 Carolina Costa Mota Parafba, UFSCar
 Caroline Tenório Mendes de Aquino, UFC
 Cibele Maria Russo Noveli, ICMC/USP
 Cleber Martins Xavier, USP-UFSCar
 Cristel Ecaterin Vera Tapia, USP-UFSCar
 Daiane Aparecida Zuanetti, USP-UFSCar
 Daiane de Souza Santos, USP-UFSCar
 Daniele Cristina Tita Granzotto, UFSCar
 Daniele Nóbrega Bitencourt, USP
 Danielle Gonçalves de Oliveira Prado, UFLA
 Danila Maria A. de Abreu Silva, USP-UFSCar
 Dante Reynaldo Baldeon Molleda, USP
 Eder Angelo Milani, USP-UFSCar
 Elizabeth Chipa Bedia, USP-UFSCar
 Emmanuel Lesaffre, KUL, Belgium
 Eveliny Barroso da Silva, USP-UFSCar
 Franciele Lopes da Silva, IFSP
 Francisco Antonio Rojas Rojas, UFSCar
 Francisco Louzada, ICMC/USP
 George Lucas Moraes Pezzott, USP-UFSCar
 Gustavo H. A. Pereira, UFSCar
 Helio dos Santos Migon, UFRJ
 Jeremias da Silva Leão, USP-UFSCar
 Jorge Luis Bazán Guzman, USP
 José Clelto Barros Gomes, USP-UFSCar
 Juan Pablo Mamami Bustamante, USP-UFSCar
 Juliana Scudilio Rodrigues, ICMC/USP
 Julio da Motta Singer, IME/USP
 Karina B. Emboaba de Oliveira, ICMC/USP
 Katherine Zavaleta, USP-UFSCar
 Lia Hanna Martins Morita, USP-UFSCar
 Lorena Yanet Cáceres Tomaya, USP-UFSCar
 Lucas Schmidt Cavalcante, USP
 Luis Ernesto Bueno Salazar, UFSCar
 Manuel Galea Rojas, PUC de Chile, Chile
 Marcelo Andrade da Silva, UNESP
 Marcelo Hartmann, USP-UFSCar
 Márcia Ap. Centanin Macera, UFSCar
 Márcio A. Diniz, UFSCar
 Márcio Augusto Diniz, USP
 Marco Pollo Almeida, USP-UFSCar
 Mariana Curi, ICMC/USP
 Mário de Castro, ICMC/USP
 Mauro Ribeiro de Oliveira Jr., CEF and UFSCar
 Nancy Lopes Garcia, UNICAMP
 Nicholas Wagner Eugenio, USP-UFSCar
 Nikolai Valtchev Kolev, IME/USP
 Patricia Gilavert Fernandes, USP
 Rafael Aguilera Mazzei, IME/USP
 Rafael de Carvalho Ceregatti, ICMC/USP
 Rafael Izbicki, UFSCar
 Raydonal Ospina Martínez, UFPE
 Ricardo Felipe Ferreira, USP-UFSCar
 Roberta de Souza, USP-UFSCar
 Rosineide Fernando da Paz, UFSCar
 Suzane Ellen Hayashi Nascimento, USP
 Tamyris Marconi, USP-UFSCar
 Thales Akira Matsumoto Ricarte, USP-UFSCar
 Themis da Costa Abensur, USP-UFSCar
 Tiago de Miranda Fragoso, ICMC/USP
 Tiago Magalhães, IME/USP
 Tiago Ramos Biondo, ICMC/USP
 Vanessa Rufino da Silva, USP-UFSCar
 Vera Lucia Damasceno Tomazella, UFSCar
 Waldomiro Barioni Junior, EMBRAPA
 Yoav Bergner, ETS, USA
 Yuri Rojas Benites, USP-UFSCar