PIPGES · WEBINARS

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The video call link will be available at:

https://tiny.one/faria

DYNAMIC BAYESIAN MODELS FOR NON-LINEAR NON-STATIONARY TIME SERIES PROCESSES

Dynamic Bayesian Smooth Transition Autoregressive (DBSTAR) models are proposed for non-linear autoregressive time series processes as alternative to both the classical Smooth Transition Autoregressive (STAR) models of Chan and Tong (1986) and the Bayesian Simulation STAR (BSTAR) models of Lopes and Salazar (2005). Unlike the STAR and BSTAR models, DBSTAR models are sequential polynomial dynamic analytical models suitable for inherently non-stationary time series with non-linear characteristics such as asymmetric cycles. As they are analytical, they also avoid potential computational problems associated with BSTAR models and allow fast sequential estimation of parameters. Two types of DBSTAR models, namely the Taylor and the B-splines DBSTAR models are formulated. A harmonic version of those models, that accounted for the cyclical component explicitly in a flexible yet parsimonious way, were applied to the well-known series of annual Canadian lynx trappings and showed improved fitting when compared to both the classical STAR and the BSTAR models. Another application to a long series of hourly electricity loading in southern Brazil, covering the period of the South-African Football World Cup in June 2010, illustrates the short-term forecasting accuracy of fast computing harmonic DBSTAR models that account for various characteristics such as periodic behaviour (both within-the-day and within-the-week) and average temperature.

SPEAKER

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Interinstitutional Graduate Program in Statistics (PIPGES) of Federal University of São Carlos with University of São Paulo promotes seminars groups (temporarily webinars, due to pandemic issues) of researches involving Probability, Statistics, Machine Learning etc. Our interest, among other things, is to stimulate the sharing of knowledge, as well as the connection between members of the program and researchers in other institutions.

Organizer

Michel H. Montoril, Department of Statistics,
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BIO

Alvaro Faria is a lecturer in Statistics at the School of Mathematics and Statistics of the Open University, UK. He was previously a lecturer in Management Science at Lancaster University, and a research fellow in Statistics at Warwick University. He has a PhD in Statistics from Warwick, an MSc and a BSC in Systems Engineering from PUC-Rio. His current research interests include Bayesian time series forecasting, the combination of statistical models, expert judgement, Bayesian modelling of space-time processes and the application of forecasting models in tailings dams.