Statistics and Actuarial Science Seminar

Title: Count Time Series Models and their Applications

Speaker: Wagner Barreto De Souza (King Abdullah University of Science and Technology)

Date: Mon 18th October 2021 at 12:00PM

Location: Online

Abstract: In this presentation, I will talk about two recent count time series models. The first one is a log-linear Poisson regression model driven by a stationary latent gamma autoregression. This process has negative binomial (NB) marginals to analyze overdispersed count time series data. Estimation and statistical inference are performed using a composite (CL) likelihood approach. An empirical illustration of the NB process is presented for the monthly number of viral hepatitis cases in Goiânia (capital and largest city of the Brazilian state of Goiás) from January 2001 to December 2018. The second model is a Nearly Unstable INteger-valued AutoRegressive Conditional Heteroskedasticity (NU-INARCH) process. It is proved that a proper normalization of the NU-INARCH process endowed with a Skorohod topology weakly converges to a Cox-Ingersoll-Ross diffusion. The asymptotic distribution of the conditional least squares estimator of the correlation parameter is established as a functional of certain stochastic integrals, and a unit root testing is developed. The proposed methodology is applied to the daily number of deaths due to COVID-19 in the United Kingdom.

References:

Barreto-Souza, W., Ombao, H. (2021). The negative binomial process: A tractable model with composite-likelihood based inference. Scandinavian Journal of Statistics. In Press. https://onlinelibrary.wiley.com/doi/full/10.1111/sjos.12528

Barreto-Souza, W., Chan, N.H. (2021). Nearly unstable integer-valued ARCH process and unit root testing. Submitted for publication. ArXiv link: https://arxiv.org/abs/2107.07963

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