



Department of Decision Sciences

Statistics Seminar

Bayesian nonparametric modeling of multiple time series: an application to recurrent events

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12:30pm Room 3-E4-SR03 Via Rontgen 1 Milano

Abstract

In this talk, I am going to present a class of semiparametric Bayesian models for multiple time series, when the time window is not necessarily the same for each subject in the sample. Time dependency is taken into account through autoregressive models for the observations or for the subject-specific random effects. The autoregressive parameters are given a Bayesian nonparametric mixture prior: in the simplest case, the random mixing distribution is the Dirichlet process, but more general random probabilities, as normalized completely random measures, can be assumed. Covariates may be included in this framework. I will also discuss basic Bayesian techniques to choose the order of dependence of the autoregression, as well as MCMC algorithms to simulate from the posterior. This class of models will be applied in the context of recurrent events, when individuals experience a relatively small number of repeated events. These types of processes arise frequently in medical studies, where information is often available on many individuals, each of which may experience transient clinical events repeatedly over a period of observation. Therefore, the sequence of waiting times between recurrent events of the patient represents the individual time series. An application of this model to repeated infection data will be illustrated.

This is a joint ongoing work with Maria De Iorio and Marta Tallarita, UCL (UK) and Giorgio Paulon, Politecnico di Milano.