A unified construction for series representations and finite approximations of completely random measures

A seminar by François Caron

University of Oxford - UK

Friday 24 Mar 2023 | 12:30 p.m.
Room Benvenuti and live Zoom
Department of Statistical Sciences

Infinite-activity completely random measures (CRMs) have become important building blocks of complex Bayesian nonparametric models. They have been successfully used in various applications such as clustering, density estimation, latent feature models, survival analysis or network science. Popular infinite-activity CRMs include the (generalized) gamma process and the (stable) beta process. However, except in some specific cases, exact simulation or scalable inference with these models is challenging and finite-dimensional approximations are often considered. In this work, we propose a general and unified framework to derive both series representations and finite-dimensional approximations of CRMs. Our framework can be seen as a generalization of constructions based on size-biased sampling of Poisson point process [Perman et al., 1992]. It includes as special cases several known series representations and finite approximations as well as novel ones. In particular, we show that one can get novel series representations for the generalized gamma process and the stable beta process. We show how these constructions can be used to derive novel algorithms for posterior inference, including a generalization of the slice sampler for normalized CRMs mixture models introduced by Griffin and Walker [2011]. We also provide some analysis of the truncation error.

Joint work with Juho Lee and Xenia Miscouridou

800 ANNI 1222·2022 UNIVERSITÀ DEGLI STUDI DI PADOVA
DIPARTIMENTO DI SCIENZE STATISTICHE