



Department of Decision Sciences

Statistics Seminar

Bayesian nonparametric approaches for the analysis of compositional data based on Bernstein polynomials

Alejandro Jara

Pontificia Universidad Catolica de Chile

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Abstract

We will discuss Bayesian nonparametric procedures for density estimation and fully nonparametric regression for compositional data, that is, data supported in a multidimensional simplex. The procedures are based on modified classes of Bernstein polynomials. We show that the modified classes retain the well known approximation properties of the classical versions defined on an hypercube and on a multidimensional simplex. Based on these classes, we define prior distributions, and study the support and asymptotic behavior of the posterior distribution under iid sampling. Finally, novel classes of probability models for sets of predictor-dependent probability distributions are proposed. Appealing theoretical properties such as support, continuity, marginal distribution, correlation structure, and consistency of the posterior distribution are studied.

Keywords: Simplex; Random Bernstein polynomials; Dependent Dirichlet processes