MICHIGAN STATE UNIVERSITY
Department of Statistics and Probability

COLLOQUIUM

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Penalized Approach for Spatial Point Processes Intensity Estimation

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Abstract

Statistics for spatial point processes does not avoid questions related to high dimension. One problem, for instance, is the understanding of the arrangement a point pattern (such as the locations of trees in a forest) and a large number of variables such as the altitude, the slope of elevation, soil nature variables, interactions between these variables, etc. We are interested, here, in the parametric estimation of the intensity of a spatial point process in the situation where the number of variables p is large and even increases with the domain of observation. In such a context, we investigate, on the one hand, regularized versions of the Poisson likelihood (using convex or non-convex penalties) and, on the other hand an extension appropriate to spatial point processes of an adaptive version of the Dantzig selector, propsed initially by Candes and Tao (2005) for linear models. For a large class of convex or non convex penalty functions and for a large class of spatial point processes, we show that both approaches can yield an estimator satisfying parsimony and a central limit theorem. We will discuss numerical problems involved by both approaches. The efficiency of the procedure will be illustrated via simulations and an application to a forestry dataset will be proposed.

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