MASTER'S THESIS

Isotropy test and variance estimation for high order statistics of spatial point process

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Isotropy Test and Variance Estimation for High Order Statistics of Spatial Point Processes

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Abstract

Spatial point processes are stochastic models for analyzing spatial point patterns. In this thesis, we derive a method to test whether a given point pattern is a realization of an isotropic (rotation-invariant) model, based on the Voronoi diagram of the given point pattern. Monte Carlo procedure is employed to approximate the distribution of the test statistic. We demonstrate the power of the proposed test through simulation, compared it with the best isotropy test to-date, and applied to the Ambrosia dumosa data. Moreover, we introduce high order statistics of multivariate spatial point process and propose variance estimation procedure for them. Under some mild conditions, we prove that the proposed variance estimator is consistent for the target variance.

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