

Abstract:

Voronoi estimators are non-parametric and adaptive estimators of the intensity of a point process. The intensity estimate at a given location is equal to the reciprocal of the size of the Voronoi/Dirichlet cell containing that location. Their major drawback is that they tend to paradoxically under-smooth the data in regions where the point density of the observed point pattern is high, and over-smooth where the point density is low.

In this talk we present a remedy to this behaviour, given by applying an additional smoothing operation to the Voronoi estimator, based on resampling the point pattern by independent random thinning. Through a simulation study we show that our resample-smoothing technique improves the estimation substantially. In addition, we present some results on statistical properties such as unbiasedness and variance, and indicate a rule-of-thumb and a data-driven cross-validation approach to choose the amount of smoothing to apply. We further apply our proposed intensity estimation scheme to real point pattern data.