

Bayesian analysis of a Gibbs hard-core point pattern model with varying repulsion range

Tuomas Rajala
University of Jyväskylä

Abstract:

Gibbs point processes are statistical models for spatial point patterns with repulsive interactions between points. Traditionally a constant repulsion range is assumed. In reality, the repulsion range might change from location to location as a result of environmental heterogeneity.

In this talk I will discuss the modeling of space varying repulsion range parameter in Bayesian framework using Gaussian process regularisation. The key observation is that the straightforward use of finite Gibbs hard-core process likelihood together with log-Gaussian random field prior does not work without penalization towards high local packing density. Instead, a nearest neighbour Gibbs process likelihood is used. As an example, the nest locations of Sand Martin (*Riparia riparia*) colony in a vertical sand bank are analysed.