Lin_Appendix

Frances Lin

5/25/2021

Appendix

Algorithm 1: HPP

Algorithm 1

Algorithm 2: NPP

Algorithm 2: NPP is omitted. Instead, we discuss the thinning algorithm (or acceptance-rejection method) in details and show Algorithm 3 next.

Algorithm 3: Hawkes

In this example, we use the thinning algorithm to simulate a (temporal) Hawkes process since it is one of the most popular choices for simulating both temporal and spatio-temporal NPP.

Broadly put, thinning algorithm involves randomly deleting points from a point pattern. **ELABORATE MORE**.

Algorithm 3

Figure 5 as shown previously is a realization of a Hawkes process with the exponentially decaying triggering function ($\mu = 0.5, \alpha = 0.7, \beta = 0.5$).

Simulations of HPP, NPP, Cox and Matern Cluster Process in 2D using the spatstat package of `R`

All of the corresponding plots in 2D are created using the **spatstat** package of `R`.

HPP

NPP

Cox Process

Matern Cluster Process

Simulations of Matern cluster process are generated using the `rMatClust` function. Specifically, the process involves generating homogeneous Poisson parents and each parent gives rise to Poisson number of offspring uniformly distributed in a disc of radius r centered around the parent. `kappa` controls the intensity of the cluster centers and allows us to specify the number of clusters. `r` specifies how far away cluster is from one another in radius, and `mu` gives the mean number of points per cluster.