

Prequel to Hawkes Processes: An Overview of Temporal and Spatio-Temporal Point Processes and Some Simulations

Frances Lin

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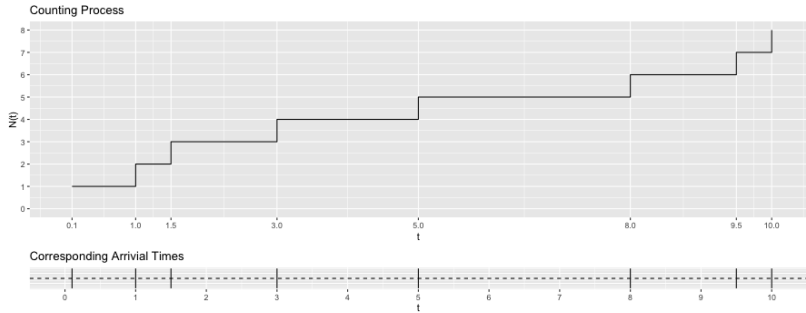
Background and Objectives

Introductions, Definitions, Properties, and Applications

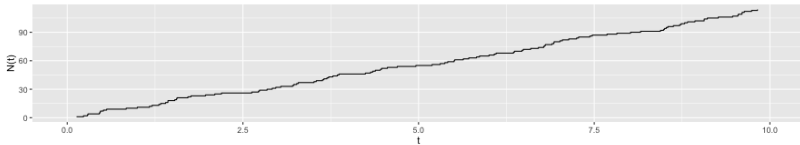
1. Counting process
2. HPP (Homogeneous Poisson Process)
3. NPP (Nonhomogeneous Poisson Process)
4. Cox and Cluster processes
5. Hawkes process
6. Spatio-temporal SEPP (Self-exciting point process)

Counting Process

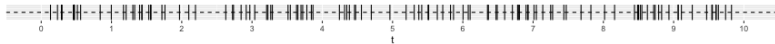
Counting Process



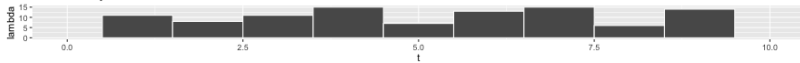
HPP (Homogeneous Poisson Process)

Homogeneous Poisson Process ($\lambda = 10$)

Corresponding Inter-Arrival Times



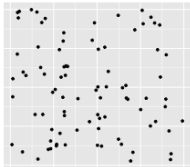
Rate/Intensity



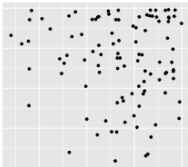
NPP (Nonhomogeneous Poisson Process)

HPP vs. NPP in 2D

HPP (rate = 100)



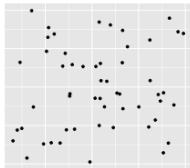
NPP



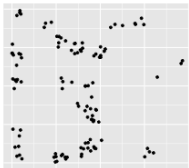
Cox and Cluter Processes

Cox vs. Matern Cluster in 2D

Cox Process

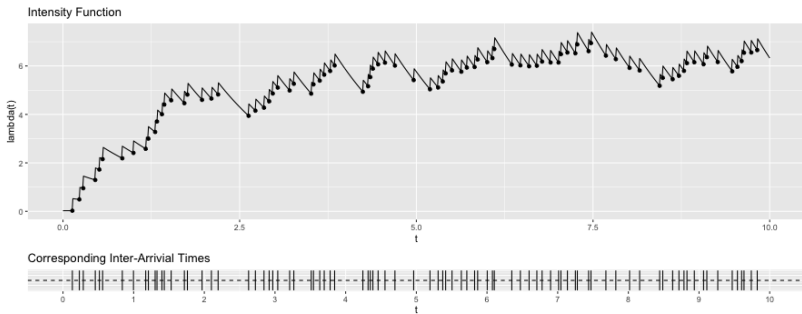


Matern Cluster Process



(Temporal) Hawkes Process

Hawkes Process



Spatio-temporal SEPP (Self-Exciting Point Process)

Acknowledgments

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