Lin_Masters

Frances Lin

June 2021

Major Professor: James Molyneux

Committee Members: Lisa Madsen & Charlotte Wickham

I. Abstract

II. Introduction

Motivation

Applications

Objectives

III. Definitions and Graphs

Counting Process

(Point Process) Let $\{T_i, i \in N\}$ be a sequence of non-negative random variables such that $T_i < T_{i+1}$ $\forall i \in N$, a point process on R^+ is defined as

$$T_i, i \in N$$

(Counting Process) If *N(t)* is the total number of events occur at time *t*, a stocastic process is said to be a counting process and is defined as

$$N(t), t \geq 0$$

(Counting Process) Let $\{T_i, i \in N\}$ be a point process, a counting process associated with $\{T_i, i \in N\}$ is defined as

$$N(t) = \sum_{i \in N} I_{\{T_i \leq t\}}$$

A counting process has to satisfy

1. $N(t) \geq 0$
2. $N(t)$ is an integer
3. If $s \leq t$, then $N(s) \leq N(t)$
4. If $s < t$, then $N(t) - N(s)$ is the number of events occur in the interval (s, t]

Poisson Process

Nonhomogeneous Poisson Process

Hawkes Process

1. Intensity-based Hawkes Process
2. Cluster-based Hawkes Process

IV. Algorithms

V. Conclusions and Discussion

Acknowledgments

Reference