Lin_Algorithms

Frances Lin

June 2021

Algorithm 1: Simulations of a HPP

Input λ, t_{max}

1. Initialize t, t_{vector}
2. **while** $(t \leq t_{max})$
3. Generate $u \sim U(0,1)$
4. Set $t = t + w$ where $w = -log(u)/\lambda \sim exp(\lambda^* = \lambda)$
5. **if** $(t \leq t_{max})$
6. | Add $t_{vector} = c(t_{vector}, t)$
7. **else**
8. | **return** $\{t_k\}_{k=0,1,...}$

Algorithm 2: Simulations of a Hawkes Process via Thinning Algorithm

---

Imput μ, α, β, λ, t_{max}

1. Simulate a HPP using Algorithm 1
2. Create a $\lambda(t)$ function where the function $= \mu + \sum_{i:T_i<t} \alpha e^{-\beta x}$
3. Set λ^* = apply the $\lambda(t)$ function to the HPP
4. Generate $u \sim U(0,1)$
5. **if** $(u < min(\frac{\lambda^*}{\lambda}, 1))$ where the accepting probability $= min(\lambda^*/\lambda, 1)$
6. | Accept the points
7. **else**
8. | "Thin" or reject the points and **return** $\{t_k\}_{k=0,1,...}$
