

Proposed Title

Jump Diffusion with a Heterogeneous Poisson Processes

Names of each project member

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Problem Statement

In traditional jump diffusion models, it is assumed that at no point in time is a jump more likely than at any other point. In my practical applications, this assumption is inappropriate. For example, publicly traded equities with quarterly earnings calls naturally have atypical behavior prior to, at, and after those earnings calls. In this inquiry, we relax the traditional assumption that n_t is a homogeneous Poisson process by taking n_t to be Poisson-distributed with time-varying rate parameter $\lambda(t)$, a monotone increasing function of time.

Expected Outcome

Our objectives include:

- Build one model with a parametric $\lambda(t)$
- Build one model with a one nonparametric $\lambda(t)$
- For each of the model built, test each on an artificial data set
- For each of the model built, test each on an real-world financial data set