

## **A new fractional process: A fractional non-homogeneous Poisson process**

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We introduce a non-homogeneous fractional Poisson process by replacing the time variable in the fractional Poisson process of renewal type with the inverse stable subordinator. We characterize the resulting process by deriving its non-local governing equation. We further compute the first and second moments of the process. Eventually, we derive the distribution of arrival times.

We further give both finite-dimensional and functional limit theorems for the fractional non-homogeneous Poisson process and the fractional compound Poisson process. The results are derived by using martingale methods, regular variation properties and Anscombe's theorem. Some of the limit results are verified in a Monte Carlo simulation.

This is based on joint papers with N. Leonenko and M. Trinh available at <https://arxiv.org/abs/1601.03965> <https://arxiv.org/abs/1711.08768>