

# The Hawkes process with different exciting functions and its asymptotic behavior\*

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## Abstract

The standard Hawkes process is constructed from a homogeneous Poisson process and using the same exciting function for different generations of offspring. We propose an extension of this process by considering different exciting functions. This consideration could be important to be taken into account in a number of fields; e.g. in seismology, where main shocks produce aftershocks with possibly different intensities. The main results are devoted to the asymptotic behavior of this extension of the Hawkes process. Indeed, a law of large numbers and a central limit theorem are stated. These results allow us to analyze the asymptotic behavior of the process when unpredictable marks are considered.

\*Working in collaboration with Victor Leiva and Jesper Møller.