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# The Markov-modulated Poisson process (MMPP) cookbook

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## Abstract

Point processes whose arrival rates vary randomly over time arise in many applications of interest, notably in communications modeling. The Markov-modulated Poisson process has been extensively used for modeling these processes, because it qualitatively models the time-varying arrival rate and captures some of the important correlations between the interarrival times while still remaining analytically tractable. The purpose of this paper is to collect a number of useful results about Markov-modulated Poisson processes and queues with Markov-modulated input. It is intended for non-experts or for people who are familiar with the basic concepts and algorithms, but would like a summary of recent developments. Derivations and proofs have been intentionally omitted. They can be found in the publications listed at the end of each section. Many of the results and some of the text have been taken directly from the references, and the reader is encouraged to consult the relevant references for more detailed information.



## Keywords

Markov-modulated Poisson process; Phase-type distribution

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^— Part of the work has been carried out while Wolfgang Fischer was with INRS-Telecommunications, Verdun, Que., Canada.

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