



Mathematical Statistics
Stockholm University
Research Report **2015:12**,
<http://www.math.su.se>

Asymptotic Expansions for Quasi-Stationary Distributions of Perturbed Discrete Time Semi-Markov Processes

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October 2015

Abstract

Non-linearly perturbed semi-Markov processes in discrete time are considered. Asymptotic power series expansions for quasi-stationary distributions of such processes are presented and it is shown how the coefficients in these expansions can be computed from explicit recursive formulas. As a particular case, it is described how the results can be applied for discrete time Markov chains.

Keywords: Semi-Markov process, Perturbation, Quasi-stationary distribution, Asymptotic expansion, Renewal equation, Solidarity property, First hitting time, Markov chain.

MSC2010: Primary 60K15; Secondary 41A60, 60J10, 60K05.

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