

Existence of invariant densities for substochastic semigroups

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Abstract

A piecewise deterministic Markov process is a Markov process involving a deterministic motion, described by an ordinary differential equation, interrupted at random times by random jumps. We study the problem of existence of absolutely continuous invariant measures for such processes. We can associate a substochastic semigroup on the space of integrable functions which describe the evolution of densities of the given process. The semigroup can be obtained through the Kato-Voigt perturbation theorem and its nontrivial fixed points give rise to invariant densities. We give relationships between the existence of invariant densities for such semigroups and for the discrete-time Markov process obtained by taking the continuous time process at the consecutive jump times. (This is a joint work with Weronika Biedrzycka.)