

# On Feller and Strong Feller Properties of Regime-Switching Jump-Diffusion Processes with Countable Regimes

Fubao Xi *Beijing Institution of Technology, China*

Chao ZHU *University of Wisconsin-Milwaukee, USA*, E-mail: zhu@uwm.edu

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**Abstract:** This work focuses on a class of regime-switching jump-diffusion processes, in which the switching component has infinitely and countably many states or regimes. The existence and uniqueness of the underlying process are obtained by an interlacing procedure. Then we use the coupling method and an appropriate Radon-Nikodym derivative to study the Feller and strong Feller properties of such processes.