

SPINE DECOMPOSITION AND $L \log L$ CRITERION FOR SUPERPROCESSES WITH NON-LOCAL BRANCHING MECHANISMS

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Abstract: In this paper, we provide a pathwise spine decomposition for superprocesses with both local and non-local branching mechanisms under a martingale change of measure. This result complements the related results obtained in [2,3] for superprocesses with purely local branching mechanisms and in [1,4] for multitype superprocesses. As an application of this decomposition, we obtain necessary/sufficient conditions for the limit of the fundamental martingale to be non-degenerate. In particular, we obtain extinction properties of superprocesses with non-local branching mechanisms as well as a Kesten-Stigum $L \log L$ theorem for the fundamental martingale.

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