$LlogL$ criterion for a class of super-diffusions

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Abstract.
In 1995, a martingale change of measure method was developed by R. Lyons, R. Pemantle and Y. Peres to give a new proof of the Kesten-Stigum $LlogL$ theorem for single type branching processes. Later this method was extended to prove the $LlogL$ theorem for multiple and general multiple type branching processes. In this paper we extend this method to a class of super-diffusions and establish a Kesten-Stigum $LlogL$ type theorem for super-diffusions. One of our main tools is a spine decomposition of super-diffusions.

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