

LARGE DEVIATION PRINCIPLE FOR CRITICAL BRANCHING RANDOM WALK WITH SMALL DRIFT

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Abstract: We consider critical branching random walks $V^{(n)}$, $n \geq 1$ on Z_+ . For fixed n , suppose the displacement of an offspring from its parent is given by a nearest random walk with drift $2\beta/n^\alpha$ towards the origin and reflected at origin. For any $\kappa > 2\alpha$, let $M_{[n^\kappa]}^{(n)}$ denotes the rightmost position of the particles in $[n^\kappa]$ -th generation. We prove that, conditioned on surviving after $[n^\kappa]$ generation, $M_{[n^\kappa]}^{(n)}$ satisfies a large deviation principle.

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