

On the Minimum of a Branching Random Walk

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Abstract: Consider a branching random walk on the real line and denote by \mathcal{M}_n its minimal position in the n -th generation. It is known that in the boundary case, $\mathcal{M}_n - \frac{3}{2} \log n$ is tight (see Addario-Berry and Reed (2009), Bramson and Zeitouni (2009), Aïdékon (2013)). We study here the almost sure limits of \mathcal{M}_n and present here two laws of the iterated logarithm to describe the upper and lower limits, in particular this gives a positive answer to a question in Aïdékon and Shi (2014). We also study the problem of moderate deviations of \mathcal{M}_n which is closely related to the small deviations of a class of Mandelbrot's cascades.