MOMENTS, MODERATE AND LARGE DEVIATIONS FOR A BRANCHING PROCESS IN A RANDOM ENVIRONMENT

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Abstract: Let (Z_n) be a supercritical branching process in a random environment ξ, and $W = \lim_{n\to\infty} Z_n/E[Z_n|\xi]$ be the limit of the normalized population size. We show moderate and large deviation principles for the sequence $\log Z_n$ (with appropriate normalization). In the proof, we calculate the critical value for the existence of harmonic moments of W, and show an equivalence of the moments of Z_n.