The probabilities of extinction in a branching random walk

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Abstract

We consider multitype Galton-Watson branching processes with countably infinite type sets. In particular, we study the probability of extinction in (finite or infinite) subsets of types A, that is, the probability that there exists a generation after which we never see an individual in the set A. We derive conditions under which two distinct subsets of types lead to different extinction probabilities; we discuss how many distinct extinction probabilities may exist; and finally, we make progress towards locating the extinction probabilities in the set of solutions to the fixed-point equation that characterises the branching process.