Random Iterations Approach to Branching Processes

Krishna B. Athreya

Depts of Mathematics and Statistics, Iowa State University, Ames, USA

The concept of iteration is well entrenched in the theory of branching processes especially through the generating function of population sizes, ages etc. There is also an underlying random iteration mechanism in branching processes as well. If S is a nonempty set and G is a family of functions that leave S invariant and $\{f_n\}_1^\infty$ is a sequence of *random elements* of G, then the sequence defined iteratively by $X_{n+1} = f_{n+1}(X_n)$ with X_0 given will be called a *random iterate* sequence. Most of the branching models studied in the literature are covered by the case when $\{f_n\}$ are i.i.d. This will be illustrated with a number of examples. Some results will be presented for two cases: a) When G is a family of Lipschitz maps and b) when G is a family of self similar maps.