

Lecture on July 12th, 2019

Regular Markov Chain

1 Branching Process (See 3.8)

- An individual at the end of lifetime has random number of offsprings ξ taking non-negative integer values. All offsprings are independent of each other and follow the same distribution to propagate species. Let X_n be the size of population at time $n \geq 1$ and $X_0 = 1$.
- Find the extinction probabilities.

2 Regular Matrix (See 4.1)

- Definitions and properties of regular matrix and regular M.C.
- Examples (Especially two-state model).
- Examples and more efficient method to check whether or not matrix is regular.
- A sufficient theorem to check a matrix is regular.
- A counterexample stating the conditions are not necessary.
- Alternative way to solve for limiting distribution (Unique solution to a linear equation + a normalization condition).