Lecture on July 11th, 2018
Renewal Process, Branching Process and Regular M.C.

1 Special M.C. : Renewal Process (See 3.5.4)

- Suppose the lifetime for each light bulb is i.i.d. positive integer valued r.v. Each light bulb is replaced by a new one once it burns out. Let X_n to be the age of light bulb currently in service at time n.
- Find the transition probabilities.

2 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 mean and variance of X_n using conclusions in partial sums.
- Find the extinction probabilities.

3 Regular M.C. (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.