Lecture on July 9th, 2019
First Step Analysis

1 Simple First Step Analysis - See Chap 3.4.1

- Idea: analyze the first step and then use LTP + Markov property(M.P.)

- Example: Let $\{X_n\}$ be a MC with

$$P = \begin{pmatrix} 1 & 0 & 0 \\ \alpha & \beta & \gamma \\ 0 & 0 & 1 \end{pmatrix}$$

where $0 < \alpha, \beta, \gamma < 1$.
Question:
(1) Probability of absorption in state 0? ($\frac{\alpha}{\alpha+\gamma}$)
(2) Mean time of absorption? ($\frac{1}{1-\beta} = \frac{1}{\alpha+\gamma}$)

2 General First Step Analysis - See Chap 3.4.2

- Idea: analyze the first step and then use LTP + Markov property(M.P.)

- Example: Let $\{X_n\}$ be a MC with finite states: $0, \cdots, r-1$ to be transient and $r, \cdots, N$ to be absorbing.

Question:
(1) Distribution of states over absorption?
(2) Mean time of absorption (More generally, $\mathbb{E}[\sum_{n=0}^{T-1} g(X_n)|X_0 = i]$)?