Tuesday, October 3, 2017 6:05 PM

# Lab 6

In this lab:

- random walks

## Random process

$X = (X_t : t \in T)$

a collection of random variables.

## Random walk

$S_n = X_1 + X_2 + \cdots + X_n.$

# Different random walks:

① $X_1, X_2, \cdots, X_n$ are i.i.d. and independent of time $n$.

e.g. Bernoulli process

② $X_1, X_2, \cdots, X_n$ are mutually independent but dependent on time $n$.

e.g. $X_n = \begin{cases} +2 & \text{w.p. } \cos^2\left(\frac{2\pi n}{T}\right) \\ -1 & \text{w.p. } \sin^2\left(\frac{2\pi n}{T}\right) \end{cases}$

③ The distribution of $X_n$ is affected by the value of $X_{n-1}$.

Zombie game:

| c | 5 | 3 | 2 | 1 | 0 | -2 | -3 | -4 |
|---|---|---|---|---|---|---|---|---|
| p | 0.05 | 0.1 | 0.25 | 0.2 | 0.05 | 0.2 | 0.1 | 0.05 |

dist$^n$ of $X_1$

If $X_{n-1} > 0$, $P(X_n > 0)$ increases

If $X_{n-1} < 0$, $P(X_n < 0)$ increases.