Lab 3

Recap: random variable

In this lab:

- Random Process
  - Bernoulli Process
- Poisson distribution vs Binomial distribution

Random Process

Def

A sequence of random variables.

e.g.

Bernoulli process

$X_1, X_2, X_3, X_4, \ldots\ldots$

Bernoulli(p)

Characterize a Bernoulli Process

0 1 0 0 0 1 1 0 1 0 0 0 1 0 1 0

X:

L: 2 5 1 2 4 2

S: 2 7 8 10 14 16

C: 0 1 1 1 1 2 3 3 4 4 4 4 5 5 6 6

Poisson distribution.

$X \sim Poi(\lambda)$

$$P(X=k) = \frac{\lambda^k}{k!} e^{-\lambda}, \quad k \geq 0.$$

Binomial distribution

$Y \sim Binom(n, p)$

$$P(Y=k) = \binom{n}{k} p^k (1-p)^k \quad 0 \leq k \leq n.$$

if
- n is large
- p is small
- $\lambda \approx np$

$\Rightarrow X \approx Y$