Disc. Sec. week of 1-5 Jan 20

2 most important discrete distributions

STAT 131
1 Jan 20

1) discussion section

① Binomial(n, p) (special case: Bernoulli(p) is Binomial$(1, p)$ $n = 1, 2, \ldots$ $0 < p < 1$)

② Poisson(λ), $\lambda > 0$

$$E(Y \mid \lambda) = \sum_{y=0}^{\infty} y f_Y(y \mid \lambda)$$

$$= \sum_{y=0}^{\infty} y \frac{\lambda^y e^{-\lambda}}{y!} = \lambda$$

$$V(Y) = E(Y^2) - \left(E(Y)\right)^2$$

$$\lambda(\lambda+1) - \lambda^2$$

$$SD(Y) = \sqrt{\lambda} = \lambda^2 + \lambda - \lambda^2 = \lambda$$

$$\text{skewness}(\Sigma) = \frac{1}{\sqrt{\lambda}}$$

$$f_{(\Sigma \mid n,p)}(y \mid n,p)$$

$$= \boxed{\binom{n}{y} p^{y} (1-p)^{n-y}} \; I_{\{0,1,\ldots,n\}}(y)$$

(hard to compute in p — pre-compute em)