

Random Variable & Distributions

→ S is sample space of random experiment. $X: S \rightarrow R$ is called a random variable.

$$\rightarrow \sum_{r=1}^{\infty} P(X=x_r) = 1$$

$$\rightarrow \text{Mean} = \sum x_r (P(X=x_r)) = \bar{x} \text{ (or) } \mu$$

$$\rightarrow \text{variance} = \sigma^2 = \sum (x_r - \mu)^2 P(X=x_r) = \sum (x_r^2 P(X=x_r)) - \mu^2$$

$$\rightarrow \text{Mean of } X = \underbrace{np}_{\text{no of trials}} \rightarrow P(E), \text{ variance of } X = npq, \text{ where } q = 1-p$$

$$\text{Binomial distribution } P(X=k) = {}^n C_k p^k q^{n-k}, \text{ S.D.} = \sqrt{npq}$$

$$\text{Poisson variable } P(X=k) = \frac{e^{-\lambda} \lambda^k}{k!}, \lambda = \sigma^2 = \mu, \lambda = n \cdot p$$