Probability Distributions

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0.1 Introduction

Basic abbrevations

1.1 PMF:Probability Mass Function

1.2 PGF:Probability Generating Function

1.3 MGF:Moment Generating Function

1.4 CF:Chracterstic Function

1.5 PDF:Probability Density Function

0.2 Bionomial Distribution

$$PMF : \frac{n!}{k!(n-k)!}p^k(1-p)^{n-k}$$

$$Mean : np$$

$$Variance : npq$$

$$PGF : [(1-p)+pz]^n$$

$$MGF : (1-p+pe^t)^n$$

$$CF : (1-p+pe^{it})^n$$

0.3 Poisson Distribution

$$PMF : \frac{\lambda^k e^{-\lambda}}{k!}$$

$$Mean : \lambda$$

$$Variance : \lambda$$

$$PGF : e^{\lambda(z-1)}$$

$$MGF : e^{\lambda(e^t-1)}$$

$$CF : e^{\lambda(e^{it}-1)}$$

0.4 Hypergeometric Distribution

$$PMF : \frac{\frac{K!}{k!(K-k)!}\frac{(N-K)!}{(n-k)!((N-K)-(n-k))!}}{\frac{N!}{n!(N-n)!}}$$

$$Mean : n\frac{K}{N}$$

$$Variance : n\frac{K}{N}\frac{(N-K)}{N}\frac{(N-n)}{(N-1)}$$

0.5 Normal Distribution

$$PDF : \frac{1}{\sqrt{2\pi\sigma^2}}e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

$$Mean : \mu$$

$$Variance : \sigma^2$$

$$MGF : e^{\{\mu t+\frac{1}{2}\sigma^2 t^2\}}$$

$$CF : e^{\{i\mu t-\frac{1}{2}\sigma^2 t^2\}}$$