長庚大學期中、期末考試答案用紙 科目

學年度 第 學期 考 系 姓名 學號

In the case of binomial, if n is quite large and p is small, the conditions begin to simulate to the continuous space or time implicotans of the Poisson process. The independence among Bernoulli trails in the binomial case is cosistent with principle 2 of the Poisson process, Allowing the $P \to 0$ relates to principle 3 of the Poisson process, Indeed, if n is large and p is close to 0, the Poisson distribution can be used, with $\mu = np$, to approximate binomial probabilities. If p is close to 1, we can still use the Poisson distribution to approximate binomial probabilites by interchanging what we have defined to be a success and a failure thereby changing p to a value close to 0.

科目

長庚大學期中、期末考試答案用紙

學年度 第 學期 中 考 資工 系 姓名 余永葳 學號 B0729061

1. (1) $f_X(x) = P(x=10) = C^{100}_{10}(0.1)^x(0.9)^{10-x}$ $x=1,2,\ldots\ldots n$

(2.) $E(X) = n \cdot p = 10 \times 0.1 = 1$

(3.) $Std(X) = \sqrt{n \cdot q \cdot q} = \sqrt{10 \times 0.1 \times 0.9} = 0.9487$

(4.) $f_Y(y) = \dfrac{C^{10}_{y}C^{90}_{10-y}}{C^{100}_{10}}$ #

(5.) $E(Y) + Std(Y) = \frac{10 \times 10}{100} + \sqrt{10 \cdot \frac{10}{100}(1-\frac{10}{100})}$

(6.) $f_Z(z) = C^{z-1}_{4}(0.1)^5(0.9)^{z-5}$, $z=5,6,7\ldots$

3.

(1.) $P(X \geq 10) = P(X=10) + P(X=11) + \ldots\ldots$

$= C^{100}_{10}(0.05)^{10}(0.95)^{90} + C^{100}_{11}(0.05)^{11}(0.95)^{89} + \ldots\ldots$

$E(X) = np = 100 \times 0.05 = 5$

$Std(X) = \sqrt{100 \times 0.05 \times 0.95} = 2.1794$

$P(X > 9.5) = P(Z > \frac{9.5-5}{2.1794}) = P(Z > 2.064) = 1 - P(Z < 2.064) = 1 - 0.9803$

$= 0.0197 = 1.97\%$

(2.) 接受，因為當發生10個或更多時的机率為1.97%(低於5%)，因此不太會發生，接受。

2.(1.) $f_W(w) = \dfrac{e^{-100}100^w}{w!}$ $w = 0,1,2,\cdots$

(2.) $E(W) = 100$,

$Std(W) = \sqrt{100} = 10$

$E(W) + Std(W) = 110$ #

(4.) $P(W > 120) = 1 - \sum_{x=0}^{120}(w;100)$

(5.) 120件 100天 平均一天1.2件，可收受。

4. $b(x;n,p) = \binom{n}{x} \cdot p^x \cdot q^{n-x}$ $\begin{matrix} n \to \infty \\ p \to 0 \\ n \cdot p \to \mu \end{matrix}$

$p(x;\mu) = \dfrac{\mu^x}{x!} \cdot e^{-\mu}$