# Tutorial

Friday, August 16, 2013 9:42 AM

① (a) $P[X>1] = 1 - P[X \le 1] = 1 - P[X=0] - P[X=1] = 1 - e^{-\alpha} - \alpha e^{-\alpha}$

$\quad\; = P[X=2] + P[X=3] + P[X=4] + \dots$

(b) $\alpha = 1$ $\quad 1 - e^{-1} - e^{-1} = 1 - \frac{2}{e} \approx 0.2642$

② $\alpha = \lambda T = 0.7$, $\lambda = 0.7$, $T = 1$

(i) $P[N=1]$ exactly $= e^{-\alpha}\frac{\alpha^1}{1!} = \alpha e^{-\alpha} = 0.7 e^{-0.7} \approx 0.3476$

At most 1 $\quad P[N \le 1]$

At least 1 $\quad P[N \ge 1]$

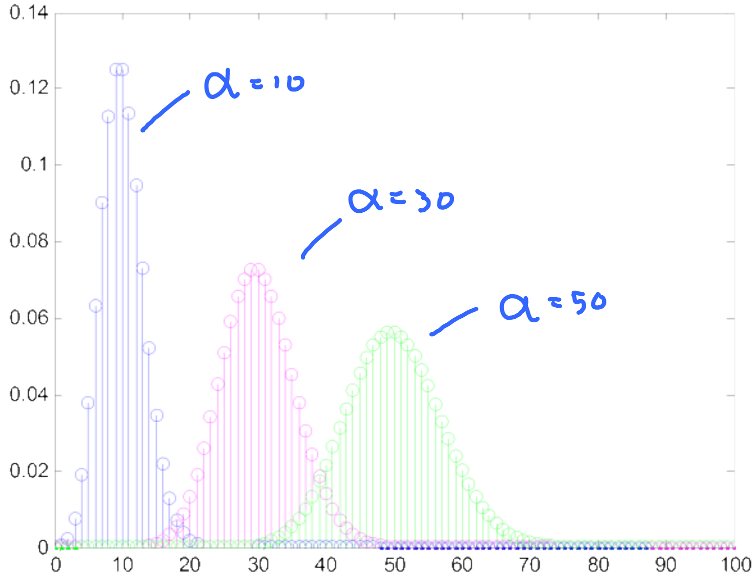
(ii) $P[N>3] = 1 - \sum_{k=0}^{3} P[N=k] = 1 - \sum_{k=0}^{3} e^{-\alpha}\frac{\alpha^k}{k!} = 0.0058$, $\alpha = 0.7$

(iii) $P[1 \le N \le 4] = \sum_{k=1}^{4} e^{-\alpha}\frac{\alpha^k}{k!} = 0.5026$

③ $\lambda = 2$ $\quad \mathcal{P}(\alpha)$ $\quad \alpha = \lambda T = 2 \times 5 = 10$

$P[M<2] = P[M=0] + P[M=1] = \sum_{k=0}^{1} e^{-10}\frac{10^k}{k!} \approx 5 \times 10^{-4}$

④



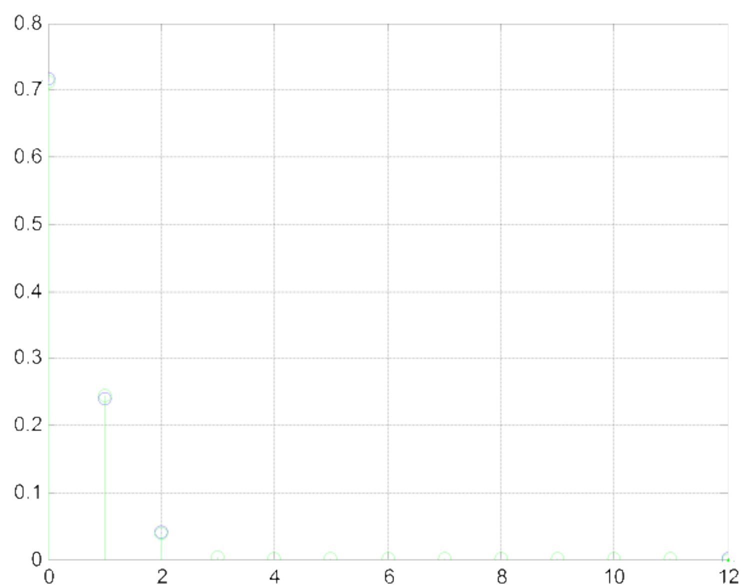

⑤ (a) $P[X=k] = \binom{n}{k} p^k (1-p)^{n-k}$ $n = 12$, $p = 1/36$

0.7132 0.2445 0.0384

(b) $P[X=k] = e^{-\alpha} \dfrac{\alpha^k}{k!}$ $\alpha = np = 12 \times \dfrac{1}{36} = \dfrac{1}{3}$

0.7165 0.2388 0.0398

(c)



(d)