5.1)

$E(\overline{X}) = \theta, E(X_{(n)}) = \frac{n}{n+1}2\theta$

是无偏估计

5.2)

样本一阶原点矩是总体一阶原点矩的强相合估计

$\therefore \hat{\theta}_1$是强相合估计

$\because n \to \infty$

$\therefore P(|X_{(n)} - \frac{n}{n+1}2\theta| \geq \epsilon) = P(|X_{(n)} - 2\theta| \geq \epsilon) = 0$

$\therefore P(|X_{(n)}/2 - \theta| \geq \epsilon) = 0$

是弱相合估计

5.3)

$Var(\hat{\theta}_1) = S^2/n = \theta/6n$

$\because X_{(n)} \sim 2\theta\beta(n,1)$

$\therefore Var(\hat{\theta}_2) = \dfrac{\theta^2}{n(n+2)}$

$\therefore$当$6\theta > n+2$时，$\hat{\theta}_1$更有效，反之$\hat{\theta}_2$更有效

9)

$P(X > 1) = P(N(0,1) > \dfrac{1-a}{\sigma}) = 1 - \phi(\dfrac{1-a}{\sigma}) = 1 - \phi(\dfrac{1-a_{n1}}{\sqrt{m_{n2}}})$

10)

$\because E(X) = \frac{r}{\lambda}$

$\therefore \hat{\lambda} = r/a_{n1}$

$E(\hat{\lambda}) = \frac{r}{E(a_{n1})} = r/E(X) = \lambda$

无偏