例6.4 (P.190)

$E(x_i)=\mu$, $V(x_i)=\sigma^2=E(x_i)^2-\mu^2$

$=E(x^2)-E^2(x)$

$V(\bar{x})=\frac{\sigma^2}{n}=E(\bar{x}^2)-\mu^2$

$E(\hat{\theta})=E\left(\frac{\Sigma(x_i-\bar{x})^2}{n}\right)\neq\sigma^2$

$=\frac{n-1}{n}\sigma^2$

$E\left(\sum_{i=1}^{n}x_i^2-n\bar{x}^2\right)$

$=n\sigma^2+n\mu^2-\sigma^2-n\mu^2$

$E(\hat{\sigma}^2)=E\left(\frac{\sum_{i=1}^{n}(x_i-\bar{x})^2}{n-1}\right)$

$=\frac{1}{n-1}E\left(\sum_{i=1}^{n}x_i^2-n\bar{x}^2\right)$

→ 母體變異數σ^2之偏誤估計量 $=\sigma^2$

→ 母體變異數σ^2之不偏估計量

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