依 $E(X_i)=\mu$，$V(X_i)=\sigma^2=E(X_i^2)-\mu^2$.

則 $E(\overline{X})=\mu$，$V(\overline{X})=\dfrac{\sigma^2}{n}=E(\overline{X}^2)-\mu^2$

$E(\hat{\theta}_1)=E\left(\dfrac{\sum\limits_{i=1}^{n}(X_i-\overline{X})^2}{n}\right)=\dfrac{1}{n}E\left(\sum\limits_{i=1}^{n}X_i^2-n\overline{X}^2\right)$

$=\dfrac{1}{n}(n\sigma^2+n\mu^2-\sigma^2-n\mu^2)=\dfrac{n-1}{n}\sigma^2$

$E(\hat{\theta}_2)=E\left(\dfrac{\sum\limits_{i=1}^{n}(X_i-\overline{X})^2}{n-1}\right)=\dfrac{1}{n-1}E\left(\sum\limits_{i=1}^{n}X_i^2-n\overline{X}^2\right)$

$=\dfrac{1}{n-1}(n\sigma^2+n\mu^2-\sigma^2-n\mu^2)=\sigma^2$

$\rightarrow$ $\hat{\theta}_2=\sum\limits_{i=1}^{n}(X_i-\overline{X})^2\big/(n-1)$ 為母體變異數 σ^2 之不偏

估計量，$\hat{\theta}_1=\sum\limits_{i=1}^{n}(X_i-\overline{X})^2\big/n$ 為母體變異數 σ^2

偏誤估計量。

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