$E(\bar{x}) = \mu \quad V(\bar{x}) = \frac{\sigma^2}{n} = E(\bar{x}^2) - \mu^2$ A107270054

吴晨莉

$E(\hat{\theta}_1) = E\left(\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n}\right) = \frac{1}{n} E\left(\sum_{i=1}^{n} x_i^2 - n\bar{x}^2\right)$

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

$E(\hat{\theta}_2) = E\left(\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}\right) = \frac{1}{n-1} E\left(\sum_{i=1}^{n} x_i^2 - n\bar{x}^2\right)$

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

$\hat{\theta}_2 = \frac{\sum_{i=1}^{n}(x_i - \bar{x}^2)}{n-1}$ 满足不偏性