

SMF PROBLEMS 1. 12.10.2017

Q1. In a normal model $N(\mu, \sigma^2)$, show that \bar{X} is efficient for μ .

Q2. In $N(\mu, \sigma^2)$ with μ known, show that $\frac{1}{n} \sum_1^n (X_i - \mu)^2$ is efficient for $v := \sigma^2$.

Q3. In $N(\mu, \sigma^2)$ with σ the parameter of interest but μ unknown (so a nuisance parameter), show that the unbiased sample variance

$$S_u^2 := \frac{1}{n-1} \sum_1^n (X_i - \bar{X})^2$$

is asymptotically efficient for $v := \sigma^2$, with efficiency $1 - 1/n \rightarrow 1$.

NHB