1. New

UMV

Let:

- *statements*
-

Then, *item* is a/an entity if:

- *conditions*
-

We denote:

- *property* : *notation*
-

Efficient

Let:

- $(\Omega, \mathcal{A}, \mathcal{P})$ parametric statistical model
- $X : \Omega \to \mathbb{R}$ random variable
- $\Theta \subset \mathbb{R}$ interval
- χ_F real estimator with integrable quadratic
-

Then, *item* is a/an entity if:

- $\forall\ \theta \in \Theta$:

  $\exists\ h : \mathbb{R} \to \mathbb{R}$:

    $h \geq 0$

    h integrable

    $\exists\ \mathcal{U} \subset \mathbb{R}$:

      $\theta \in \mathcal{U}$

      $|T(x)L(x,\theta)\theta| \leq h$

Cramer-Rao's inequality

Let:

- same conditions of above
- $T \in \chi_F$

· regular model

· $E_\theta T = g(\theta)$

Then, holds:

· $Var_\theta(T) \geq \frac{g'(\theta)^2}{I(\theta)}$

Demonstration:

$|E(\log(L(x,\theta))(T(x) - g(\theta)\theta| \leq \sqrt{E_\theta(\log(L(x,\theta))\theta)^2 E_\theta(T(x) - g(\theta))^2} = \sqrt{I(\theta) Var_\theta T}$

$E(\log(L(x,\theta))(T(x)g(\theta)\theta = E_\theta(\log(L(x,\theta)T(x))\theta - g(\theta)E_\theta(\log(L(x,\theta))\theta = E_\theta(\log(L(x,\theta)T(x))\theta$

$\log(L(x,\theta))\theta T(x)L(x,\theta)dx\Omega = \frac{1}{L(x,\theta)}L(x,\theta)\theta T(x)L(x,\theta)dx\Omega$

$|g'(\theta)| \leq \sqrt{I(\theta)Var_\theta(T)}$

$g'(\theta)^2 \leq I(\theta)Var_\theta(T)$

Efficient

Let:

$\cdot$ mismas condiciones

Then, T is efficient if:

$\cdot\, Var_\theta T = \frac{g'(\theta)^2}{I(\theta)}$

Efficient estimators are UMV

Let:

$\cdot\, statements$

$\cdot$

Then, holds:

$\cdot\, then, holds$

$\cdot$

Demonstration:

$demonstration$

Characterization of efficient estimators

Let:

- mismas condiciones

Then, holds:

- T efficient $\leftrightarrow \exists\ \lambda(\theta)$:

$$\lambda(\theta)\log(L(x,\theta)\theta = T(x) - g(\theta)P_\theta - qs$$

Demonstration:

demonstration

si existe un estimador que da la igualdad entonces es UMV