$X_1, ..., X_n$
μ
$E(X_1 \mid \sum_{i=1}^{n} X_i)$
$1k <$
ℓn
$(X_k, \sum_{i=1}^{n} X_i)$
$(X_\ell, \sum_{i=1}^{n} X_i)$

$$W := E(X_1 \mid \sum_{i=1}^{n} X_i) = \frac{1}{n}\sum_{i=1}^{n} E(X_i \mid \sum_{i=1}^{n} X_i) = \frac{1}{n} E(\sum_{i=1}^{n} X_i \mid \sum_{i=1}^{n} X_i) = \frac{1}{n}\sum_{i=1}^{n} X_i.$$

$(X_1) =$
σ^2
$(W) =$
σ^2/n
$\sum_{i=1}^{n} X_i$
W
$\{f_\theta :$
$\theta \in$
$\Theta\}$
$\theta \subset$
R
X
f_θ
Fisher information

$$I(\theta) := I_X(\theta) := E_\theta \left(\frac{\mathrm{d}}{\mathrm{d}\theta} \log f_\theta(X)\right)^2, forall \theta \in \Theta,$$

$I(\theta)$
$\{x \in$
$R^n :$
$f_\theta(x) >$
$0\}$
not
θ
$\sigma >$
0
$f_\theta(x) :=$
$\frac{1}{\sigma\sqrt{2\pi}} \exp\left(-\frac{(x-\theta)^2}{2\sigma^2}\right)$
$x \in$
R
$\theta \in$
R
$\log f_\theta(x) =$
$\log\left(\frac{1}{\sigma\sqrt{2\pi}}\right) \cdot$
$-\frac{(x-\theta)^2}{2\sigma^2}$

$$\frac{\mathrm{d}}{\mathrm{d}\theta} \log f_\theta(X) = \frac{\mathrm{d}}{\mathrm{d}\theta} \frac{-(X-\theta)^2}{2\sigma^2},$$

$\theta) =$
$E_\theta\left(\frac{\mathrm{d}}{\mathrm{d}\theta}\frac{-(X-\theta)^2}{2\sigma^2}\right)^2 =$
$E_\theta\left(\frac{X-\theta}{\sigma^2}\right)^2 =$
$\frac{1}{\sigma^4}(X-$
$\theta) =$
$\frac{1}{\sigma^2}.$
f_θ
σ
$I(\theta)$
$_\theta\left(\frac{\mathrm{d}}{\mathrm{d}\theta}\log f_\theta(X)\right) =$
$\int_{R^n} \frac{\mathrm{d}/\mathrm{d}\theta f_\theta(x)}{f_\theta(x)} f_\theta(x)\,\mathrm{d}x =$