

# The Cramer-Rao inequality

stats6255point 625.4 - Point estimation

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# The Cramer-Rao inequality

# A version for i.i.d. random variables

# Fisher information

# Rewriting the Fisher information

## The C-R inequality for i.i.d. random variables

$$V_{\theta}[W] \geq \frac{\left(\frac{d}{d\theta} E_{\theta}[W]\right)^2}{nE_{\theta} \left[ \left(\frac{\partial}{\partial\theta} \ln f_{\theta}(X_1)\right)^2 \right]}$$

$$V_{\theta} W \geq \frac{1}{-nE_{\theta} \left[ \frac{\partial^2}{\partial\theta^2} f_{\theta}(X_1) \right]}$$

# When the assumptions fail

# A corollary using the likelihood function



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