Extra Points Opportunity: Cramer-Rao Lower Bound

STAT 343: Mathematical Statistics

This is an OPTIONAL opportunity to earn up to 5 additional quiz points. You may consult your class notes on consistency and efficiency if you find it helpful.

This is due no later than *Thursday, April 22* at 11:59 PM ET

Question

Consider the following statement regarding some unbiased estimator T of Θ and the Cramer-Rao lower bound.

"If $Var(T) \geq \frac{1}{I(\theta_0)}$, then T has the smallest variance among all unbiased estimators of θ and can be considered efficient."

There is an error in the previous statement. Please correct the statement to make it true and include 1-2 sentences explaining why it is wrong.

You may find it helpful to consider the following:

What if I have two unbiased estimators of Θ, T_1 *and* T_2. *It is guaranteed that* $Var(T_1) \geq \frac{1}{I(\theta_0)}$ *and* $Var(T_2) \geq \frac{1}{I(\theta_0)}$. *If the statement above were true, what are the implications for the variances of these two estimators?*