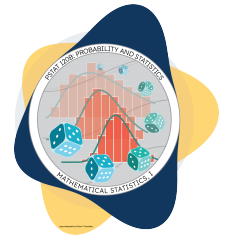


DISCUSSION WORKSHEET 07

PSTAT 120B: Mathematical Statistics, I
Summer Session A, 2024 with Instructor: Ethan P. Marzban



Conceptual Review

- What is the **Cramér-Rao Lower Bound**? How does that relate to the **Fisher Information**?
- What is an **efficient estimator**?
- What is a **confidence interval**? How do we construct one assuming normality in the population?
- What is a **pivotal quantity**? How do we use these to construct confidence intervals?

Problem 1:

Let $Y_1, \dots, Y_n \stackrel{\text{i.i.d.}}{\sim} \text{Unif}[0, \theta]$, where both $\theta > 0$ is an unknown parameter.

- Propose a pivot for θ that is a function of $Y_{(n)}$, and show that your proposed quantity is in fact a pivot.
- Use your pivot from part (a) to construct a $(1 - \alpha) \times 100\%$ confidence interval for θ .
- Suppose we collect the following observed instance of a sample: $\vec{y} = (0.74, 1.97, 0.31, 0.18, 0.28)$. Construct a 95% confidence interval for θ .