AMAT 363 - Homework III

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Due Date: Wednesday, July 13, 2022

PROBLEM #1:

For each of the following statements, determine whether it is true or false. Label "T" if it is true, otherwise label "F".

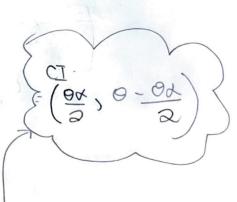
- a. Confidence intervals are constructed as interval estimators for population mean, population proportion, population variance, or population standard deviation.
- b. When constructing confidence intervals for a population parameter, confidence levels should be specified.
- c. For a confidence interval constructed for a certain parameter, the higher the confidence level is, the wider the confidence interval will be.
- d. Suppose that we are given a random sample from a certain unknown distribution with unknown variance and we are interested in constructing a 90% confidence interval for the population mean. Then it is still possible as long as the sample size is large.
- e. One can interpret the width of a confidence interval as the precision of the interval estimator; one can interpret the associated confidence level as the reliability of the interval estimator.
- f. Given a 90% confidence interval for a certain population parameter, one can understand it as follows: with probability 0.9, the interval will cover this parameter and so it is essentially an interval estimator.
- g. We would expect about 90% of a sample to lie within the 95% confidence interval of the sample mean.
- h. A confidence interval may not be symmetric about the population parameter.
- i. Let T be a random variable that has a t-distribution and $t_{\alpha,\nu}$ be a t critical value. Then we have $\Pr(T \le -t_{\alpha,\nu}) = \alpha$.
- j. The left endpoint and the right endpoint of a confidence interval are deterministic. More precisely, with a given random sample, then the two endpoints are then fixed.

Based on definition 8.5

B)
$$f(x|\theta)=1$$
 $\theta - .5 < x < \theta + .5$
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 $f(x|\theta)=1$ f

$$= \frac{\theta^{2} - \theta x - \theta x + x^{2}}{\theta^{2} - \theta \theta x + x^{2} + x^{2}} \ge 1 - \alpha$$

$$\frac{2}{\theta^2} = 21 - \alpha$$



Based on 8.2 textbook

$$\mathbb{B}$$

X 12,-0/2 5

=
$$P(U_{n-1,.025} \frac{S^2}{n} < \frac{\sigma^2}{16}) \ge .90$$

$$= P\left(\frac{(n-1)s^{2}}{\sigma^{2}} \leq \frac{(n-1)n}{t_{n-1, 0}^{2} \cdot 64}\right) \geq .90$$

This gives smallest i size

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multiply by (n-1)

Mean = $U \times n \times 1 - U \times SD = \sigma^{2} \times 1 + \sigma^{2} \times 1 +$

Based on 8:12 T: X-Xn+)

væ s² as estimate

follows + distribution, n-1 degree free Jom

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\begin{align*}
\text{X + t \alpha}, n-1 & \sqrt{1} & \text{T} & \text{T}