

Due Tuesday, Mar 26

Solve the following problems and staple your solutions to this cover sheet.

1. Exercise 8.79

2. Exercise 8.81

Hint: Follow the derivation for the two-sided confidence interval.

3. Exercise 9.2

4. Exercise 9.5

Hint: $\frac{(n-1)S^2}{\sigma^2}$ has a χ^2 distribution with $n-1$ degrees of freedom.

5. Exercise 9.6

6. Exercise 9.54

7. Exercise 9.55

8. Suppose gasoline consumption of an experimental engine measured under a standard test is approximately normally distributed with standard deviation σ . The standard deviation of the gasoline consumption in 16 test runs was $S = 2.2$. Construct a 99% confidence interval for σ^2 .

9. Let Y_1, \dots, Y_n be a random sample from a uniform distribution over the interval $(0, \theta)$. Show that $\hat{\theta}_1 = \frac{2}{n} \sum_{i=1}^n Y_i$ and $\hat{\theta}_2 = \frac{n+1}{n} Y_{(n)}$ are both unbiased estimators of θ .

Find the relative efficiency $\text{eff}(\hat{\theta}_1, \hat{\theta}_2)$.

10. Let Y_1, \dots, Y_n be a random sample of size n from a distribution with probability density function $f(y) = \theta y^{\theta-1}$, $0 < y < 1$, $\theta > 0$. Find the method of moment estimator of θ .