Quiz 2
Stat 61
Due to Gradescope by 12:00AM Oct 4

1. Indicate which of the following statements about *Bayesian* estimation are FALSE. On another sheet of paper, provide a corrected version of the FALSE statements.

(a) If two studies produce different Bayesian point estimators, then at least one of the studies has made a mistake.

(b) If we find a 90% highest posterior density credible interval for a parameter θ to be [0.51, 2.20], then we are asserting that there is a 90% chance that θ is between 0.51 and 2.20.

(c) A prior in Bayes' theorem is a marginal distribution.

(d) A credible interval is always symmetric about the posterior mode.

Consider the following estimators for θ based on a sample of $X_1, \ldots, X_n$ IID random variables that follow a Gamma$(4, \theta)$ distribution with density $f(x;\theta) = \frac{\theta^4}{6} x^3 e^{-\theta x} I\{x \geq 0\}$:

$$\hat{\theta}_1 = \frac{3}{n} \sum_{i=1}^{n} \frac{1}{X_i} \qquad \hat{\theta}_2 = E\left[\hat{\theta}_1 \mid \sum_{i=1}^{n} X_i\right] \qquad \hat{\theta}_3 = \frac{4n}{\sum_{i=1}^{n} X_i}$$

2. Which of the estimators above are functions of a sufficient statistic for θ?

3. For a small sample, say of size $n = 4$, which of the estimators above has the smallest mean squared error?

4. For an incredibly large sample, say of size $n > 10,000$, which of the estimators above has the smallest mean squared error?

Submitting instructions
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