STAT 821

Homework #6
Due March 7, 2012 in class

1) Regularity conditions are needed for the information inequality. Let $X \sim U(0, \theta)$ be the uniform distribution on $(0, \theta)$. Note that $\log p(x, \theta)$ is differentiable for $\theta > x$, that is, with probability 1 for each θ, and we can thus define moments of $\partial / \partial\theta \log p(x, \theta)$. Show that, however,

(a) $E\left(\frac{\partial}{\partial\theta}\log p(X, \theta)\right) = -\frac{1}{\theta} \neq 0$

(b) $Var\left(\frac{\partial}{\partial\theta}\log p(X, \theta)\right) = 0$ and the information bound is infinite. Yet show

(c) $2X$ is unbiased for θ and has finite variance.

NOTE: The following two problems are from Chapter 2 of the textbook.

2) Problem 5.16 (a) and (b)

3) Problem 6.5

NOTE: The following two problems are from Chapter 6 of the textbook.

4) Problem 1.3

5) Problem 1.33