STA 200B Homework 6
Due: Wednesday, Feb. 19, in class

Reading: 8.7, Lecture Notes chapter 5

Problems:

Section 7.10: 22

Section 8.7: 3, 4, 5, 6, 12, 14

Additional Problems: For these problems, you can use all results presented in theorems and examples in the lecture notes, chapters 1-5.

1. Derive the completeness of $\bar{X}$ in the Bernoulli model using the theorem on complete statistics in the exponential family.
2. Derive the UMVUE for θ for a random sample drawn from the model $f(x|\theta) = \theta e^{-\theta x}$, $\theta > 0$, $x \geq 0$.
3. Find the UMVUE for σ^2 in the model $N(\mu, \sigma^2)$, where μ is known.
4. (A challenge problem – will not be on the quiz and solution will not be provided, however students who worked it out independently are invited to submit the solution by Feb 19 and will receive extra credit on the quiz score for correct solutions.) Consider the model $U(0, \theta)$, $\theta > 0$ unknown. Perform the Rao-Blackwellization of the MOM estimator $\delta(\mathbf{X}) = 2\bar{X}$ and obtain the explicit form of the resulting estimator.