Homework 7

April 1, 2015 STA 5327

Note: Unless otherwise stated, all the Chapters and Exercises are from the book *Statistical Inference* (Second edition) by Casella and Berger.

1 Reading

1. Section 7.3 (7.3.1, (until page 335 (before Theorem 7.3.9)))

2 Exercises

1. Chapter 7: 37, 42, 46, 47, 49, 50, 59, 60

2.1 Additional problem from the Exam 2 syllabus (Will use this example later in class)

Consider the Poisson regression model

$$Y_i \sim \text{Poisson}\big(\exp\{\alpha + \beta x_i\}\big)$$

where $x_i, i = 1, \ldots, n$ are constants, $\alpha \in \mathbb{R}$ and $\beta \in \mathbb{R}$.

1. Show that the joint pmf of the data forms a 2pef and find the natural sufficient statistic.
2. Find the equations satisfied by the MLE using the general results about the expected and observed values of the natural sufficient statistic in exponential families.
3. Verify (by calculus) that these equations are the same as those for a stationary point of the log-likelihood.