Statistics 630 - Assignment 9

(due Wednesday, November 9, 2014, 11:59 pm)

Instructions:

- The textbook exercises are in the book by Evans and Rosenthal. This assignment covers the material on estimation and confidence intervals from Chapter 6 discussed in Lectures 28–31.
- Whether you write out the solutions by hand or in a text document, be sure that they are *neat, legible and in order* (even if you choose to solve them in a different order).
- **Type** your name, email address, course number, section number and assignment number at the top of the first page (or cover page).
- Either scan or print your solutions to a **PDF** file under 15MB in size. It must be in a *single* file, not separate files for separate pages. Name the file using your name (for example, I could use twehrly630hw01.pdf) to avoid confusion with other students and/or assignments. *Do not* take a photo of each page and then paste them into a document – this will make your file too big and the results will generally not be very readable anyway.
- Login to your WebAssign account to upload your file. You must do this by **11:59 pm U.S. Central time**, *according to the WebAssign server*, on the due date. We highly recommend that you start the upload at least 15 minutes earlier. You can make multiple submissions, but *only the last submission will be graded.*

Answer the following problems from Chapter 6:

6.3.1 (Assess the hypothesis by first constructing the 95% confidence interval and then determining whether $\mu = 5$ is inside the confidence interval. Reject the hypothesis at level 0.05 if 5 is outside the confidence interval.)

6.3.2 (same comment)

6.3.8 (Compute both the Wald and score intervals; assess the hypothesis by determining whether $\theta = 0.65$ is inside the confidence interval)

6.4.18 (Form the bootstrap percentile and t confidence intervals using both the nonparametric bootstrap and the parametric bootstrap. Omit the confidence interval based on the sign test.)

6.5.1 (Let $\theta = \sigma^2$ in the normal pdf. Then take derivatives with respect to θ to find the information for θ.), 6.5.3

6.5.4 (Assess the hypothesis using the confidence interval and omit the power calculation) (Use the Wald interval for this problem)

(b) Construct an approximate level $\gamma = 0.95$ confidence interval (the score interval) based on the pivot,

$$\frac{\hat{\lambda} - \lambda}{\sqrt{\lambda/n}}.$$

(c) Carry out a simulation to determine which interval has better coverage properties.

6.5.5, 6.5.6

Additional problems:

A. In Problem 6.2.6, show that the mle of θ is consistent.

B. In Problem 6.2.12, show that the mle of σ^2 is consistent.

C. In Problem 6.2.12, show that the mle of σ^2 is asymptotically normal (You may use the results of Problem 6.5.1).