Statistics 3858b Assignment 2

Handout January 26, 2015; Due date: February 9, 2015

These problems are all from the course text unless otherwise stated.

1. 8.10.4 (c)-(d)

2. 8.10.16 a-c; part (c) means to calculate the variance for the limiting or normal approximation of the distribution of $\sqrt{n}(\hat{\theta}_n - \theta)$, which involves $I(\theta)$; see theorem 8.5B.

3. 8.10.17 a-d

4. 8.10.32

5. 8.10.46. Bootstrap here (part e and f) means the parametric bootstrap as discussed in class. For part (g) obtain the confidence intervals marginally, that is for each parameter separately; for this you will need to obtain the observed information matrix $I(\hat{\theta})$.

6. 8.10.48 (recall chapter 4, approximation of moments).

   Also write a R program to compare, with discussion, these two estimators using the Monte Carlo simulation method, at $\lambda = .1$ and 1. Do these for data sample $n = 50$ and 100, and $M = 1000$ Monte Carlo replicates. Within the R code, calculate the efficiency (ratio of variances) and comment on how well these compare with the propogation of errors method above. Recall Section 4.6, and see page 162 where *propogation of errors is discussed. It is a method to approximate expectations (the variance is a second moment) of a function of a r.v..*

   Remark : This is yet a third example of an estimator. It is neither the MLE or method of moments estimator.