AMS 206: Classical and Bayesian Inference (Winter 2015)

Homework 1 (due Thursday 1/22)

Note: All exercise numbers refer to the corresponding chapter/section from the textbook: M.H. DeGroot and M.J. Schervish (2012), Probability and Statistics (Fourth Edition), Addison Wesley.

1. Exercises 7.5.2 and 7.5.3
2. Exercise 7.5.5
3. Exercise 7.5.7
4. Exercise 7.5.8
5. Exercise 7.5.11
6. Exercise 7.5.12
7. Exercise 7.6.2
8. Exercise 7.6.4
9. Exercise 7.6.6
10. Exercise 7.6.15

11. Suppose that $X_1, \ldots, X_n$ form a random sample from a double exponential distribution (also referred to as Laplace distribution) for which the p.d.f. is given by

$$f(x | \mu, \sigma) = \frac{1}{2\sigma} \exp\left(-\frac{|x - \mu|}{\sigma}\right), \quad \text{for} \quad -\infty < x < \infty.$$  

Here, $\mu$ is a location parameter and $\sigma$ a scale parameter for the distribution, where $-\infty < \mu < \infty$ and $\sigma > 0$. Describe how the M.L.E. $\hat{\mu}$ of $\mu$ can be obtained (there is no closed-form expression for $\hat{\mu}$), and obtain the expression for the M.L.E. $\hat{\sigma}$ of $\sigma$.  

(Hint: use the profile likelihood approach discussed in class in the context of Example 7.5.6.)