

Due on Thursday, March 5, 2009

Make sure you show all your work on all problems; no credit will be given for just the answer.

1. Read Sections 9.1–9.4 of the text.
2. Do Problems 2 (a,d), 4 (b,d,g), 6 (a), 7 on pp. 328-334.
3. For problem 4(b), use your favorite software to plot the likelihood function when
 - (a) $n = 6$; the six values of x_i are (4, 8, 15, 16, 23, 42)
 - (b) $n = 6$; the six values of x_i are (1, 1, 1, 1, 1, 1)
 - (c) $n = 6$; the six values of x_i are (1, 1, 1, 1, 2, 3)
 - (d) $n = 12$; the twelve values of x_i are (1, 1, 1, 1, 2, 3, 1, 1, 1, 1, 2, 3)

Verify using the plots that your MLE of p maximizes the likelihood function.

4. Let X_1, X_2, \dots, X_n be iid $N(0, \theta)$ random variables. For $i = 1, \dots, n$, let $Y_i = X_i^2$.
 - (a) Show $E[Y_i] = \theta$ and $\text{Var}[Y_i] = 2\theta^2$.
 - (b) Find a function $h(\theta)$ such that

$$\sqrt{n} \frac{\bar{Y} - \theta}{h(\theta)} \xrightarrow{d} N(0, 1).$$

What theorem are you using?

- (c) Find the limiting distribution of

$$\sqrt{\frac{n}{2}} [\ln(\bar{Y}) - \ln(\theta)].$$

What theorem are you using?

Suggested additional problems (DO NOT HAND IN): problems 1, 3, 5, 8, 10, 14, 15 on pp. 328-334.