

HOMEWORK 7: MATH 183 WINTER 2013

DUE IN CLASS ON MONDAY FEB 25TH

Reading: Chapters 5.2 & 5.4 of Larsen & Marx.

Solve the following exercises in full from Larsen and Marx textbook and answer additional questions about them written in text.

- (1) 5.2.6. If $\hat{\theta}$ is an MLE estimator of θ , find (exact or asymptotic) $P(2 \leq \hat{\theta} \leq 3)$.
- (2) 5.2.10. Find distribution of MLE estimator of part (a).
- (3) 5.2.12. Find $E[\hat{\theta}]$.
- (4) 5.2.14. Find expected value of the estimator in part (a).
- (5) Suppose X_1, \dots, X_n is a sample from Binomial distribution with parameters n and p . Find MLE of p .
- (6) 5.4.4 [Hint: use slides of Chapter 3] How does the probability of the event changes when sample size n is increased?
- (7) 5.4.6
- (8) 5.4.14.
- (9) 5.4.18.
- (10) 5.4.20.

Challenge problem: Consider the density function

$$f(x; a) = \begin{cases} \frac{2}{a^2}x & \text{if } 0 \leq x \leq a \\ 0 & \text{if o.w.} \end{cases}$$

Find MLE estimators of $E[X]$ and $\text{VAR}(X)$ if you were given a sample X_1, \dots, X_n from a distribution with density function $f(x; a)$.