

Textbook: 7.14, 7.19, 7.24,

**Additional problems:**

1. HW 3.1
2. HW 3.2
3. HW 3.3
4. 7.11(a), (b), and
  - (c) Find the MLE if  $\theta$  is now restricted to be  $1 < \theta \leq 5$ .
  - (d) Find the MLE for the median of  $X_1$ .
5. Let  $X_1, \dots, X_n$  be a random sample from an Exponential distribution with p.d.f.
$$f(x \mid \lambda) = \lambda e^{-\lambda x}, \lambda > 0.$$
  - (a) Use the method of moments to find an estimator for  $\lambda$  using only the first moment.
  - (b) Use the method of moments to find an estimator for  $\lambda$  using only the second moment.
  - (c) Use the method of moments to find an estimator for  $\lambda$  using both the first and second moments.
  - (d) Find a method of moment estimator for  $P(X_1 > 1)$ .
6. For the case study in Handout 3. Find the MLE for the two parameters  $\alpha$  and  $\beta$  if you adopt the Gamma distribution assumption. You need to derive the MLE on your own through a numerical method and submit your code.

Very Important - Do not use any readymade package to obtain the MLE.

[Hint] For a simpler solution, use the profile likelihood method as described in class and Exercise 7.2.