

Assignment 1

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1. Consider the Pareto distribution shown below.

$$f(x; \beta) = \frac{\beta}{x^{\beta+1}}, x > 1$$

- a. Find $\text{marginpar}\{(2)\}$ the mean of the distribution. Suppose $\beta > 1$
 - b. Find the method of moments estimator. (2)
 - c. Find the maximum likelihood estimator. (3)
 - d. Find the asymptotic distribution of the mle. (5)
2. Consider the uniform distribution on the interval $(0, \theta)$. Consider the estimator $\hat{\theta} = 2\bar{X}$.
 - a. Is the estimator unbiased? Prove. If not, what is the bias? (2)
 - b. What is the mean squared error of the estimator? (2)
 - c. Is this estimator sufficient? Prove. (2)