

EE381 Homework #11

- 1) Measurement of a sample of weights were determined as 8.3, 10.6, 9.7, 8.8, 10.2, and 9.4 lbs, respectively. Determine unbiased and efficient estimates of
 - a) The population mean.
 - b) The population variance
 - c) Compare the sample standard deviation with the estimated population standard deviation.
- 2) The mean and standard deviation of the maximum loads supported by 60 cables are 11.09 tons and 0.73 tons, respectively. Find (a) 95%, (b) 99% confidence limits for the mean of the maximum loads of all cables produced by the company.
- 3) A sample of 12 measurements of the breaking strengths of cotton threads gave a mean of 7.38 oz and a standard deviation of 1.24 oz. Find (a) 95%, (b) 99% confidence limits for the actual mean breaking strength.
- 4) An urn contains red and white marbles in an unknown proportion. A random sample of 60 marbles selected with replacement from the urn showed that 70% were red. Find (a) 95%, (b) 99% confidence limits for the actual proportion of red marbles in the urn.
- 5) Suppose that n observations X_1, X_2, \dots, X_n are made from a Poisson distribution with unknown parameter λ . Find the maximum likelihood estimate of λ .
- 6) A population has a density function given by

$$f(x) = \begin{cases} (k+1)x^k & 0 \leq x \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

For n observations X_1, X_2, \dots, X_n made from this population, find the maximum likelihood estimate of k .

Note: Your answers should show your step-by-step work. Answers which have only final results are not accepted.