

Review and Example: Properties of estimators

1. Suppose that X_1, \dots, X_n form a random sample from the exponential distribution with rate λ .
 - (a) Find the M.L.E. of λ .
 - (b) Find the Fisher information, $I(\lambda)$, in the random sample.
 - (c) Find the asymptotic distribution of the M.L.E. and based on this distribution find a symmetric approximate 95% confidence interval for the rate of the exponential distribution.
 - (d) From a random sample of size 150, it was observed that the sum of the random variables is 6.52.

2. Suppose that X_1, \dots, X_n form a random sample from the normal distribution with mean 0 and variance σ^2 .
 - (a) Find the M.L.E. of the standard deviation, σ .
 - (b) Find the Fisher information, $I(\sigma)$, in the random sample.
 - (c) Find the asymptotic distribution of the M.L.E. of σ and based on this distribution find a symmetric approximate 95% confidence interval for the standard deviation of the normal distribution.