

Practice Test

1. Let Y_1, \dots, Y_n be an iid sample from a normal distribution with mean μ and variance μ^2 . Find the maximum likelihood estimate for μ and the information in μ in the sample. Use this to give the asymptotic variance of $\hat{\mu}$.

2. Let Y_1, \dots, Y_n be i.i.d. gamma random variables with density

$$f(y) = \frac{1}{\Gamma(\alpha)\beta^\alpha} y^{\alpha-1} e^{-y/\beta} I(y > 0)$$

(a) Write the likelihood and log likelihood functions.

(b) Find the Information matrix for the sample for α and β . You will need the derivative of the log of the $\Gamma(\cdot)$ function—just leave this as the derivative since it is a special function.

(c) Give the approximate asymptotic variance for the value of $\hat{\alpha}$.

3. Repeat problem 2 using a Uniform(a, b) distribution.