

OPTIMAL ESTIMATION University of Florida
Mechanical and Aerospace Engineering

HW 6

Issued: October 5, 2009, Due: October 9, 2009 (in class)

MLE with a single observation

Problem 1. [10 + 5 = 15 pt]

Determine the max-likelihood estimates of the mean and the variance of a Normally distributed r. v. X given a single observation of the random variable. Are the estimates unbiased?

Problem 2. [15 + 5 = 20 pt]

Suppose X is uniformly distributed between 0 and θ . Determine the max-likelihood estimates of θ given a single observation of the random variable X . Is the estimate unbiased?

MLE with multiple observations

Problem 3. [10 + 5 = 15 pt]

Determine the max-likelihood estimate of the parameter a of a Poisson distribution given n samples of a random variable X that has that distribution (that is, $P(X = k|a) = \frac{e^{-a} a^k}{k!}$). Is the estimate unbiased?

Problem 4. [10 + 5 = 15 pt]

Suppose X is Laplace distributed : $f_X(x) = \frac{\lambda}{2} e^{-\lambda|x|}$, $-\infty < x < \infty$. Determine the max-likelihood estimate of λ given n samples of a random variable X . Is the estimate unbiased?