Worksheet 09

1. Find the MLE estimator for the estimation of the parameter λ from i.i.d. observations of an exponentialy distributed random variable.

2. Find the MLE estimator for the estimation of the variance from i.i.d. observations of an exponentialy distributed random variable. Hint: This is easily derived from the previous result. Should not require any new derivatives.

3. Find the MLE estimator for the estimation of the parameter p from i.i.d. observations of a Bernoulli distributed random variable. Hint: When you set the derivative equal to zero, multiple by $\frac{1}{n}$ to write the equation in terms of just $\bar{X}$ and $\hat{p}$.

4. Find the MLE estimator for the estimation of the parameters μ and σ^2 from i.i.d. observations of a normally distributed random variable. Hint: We want to think of σ^2 as a single parameter (not the square of a parameter). I recommend using $v = \sigma^2$ to keep this clear. Also, find $\hat{\mu}$ first. You can find the MLE for the mean without knowing the MLE of the variance.

5. What is the bias of the MLE estimator for the variance from a normal distribution with unknown mean and variance? Hint: Use what we know about S_X^2 to make this relatively easy.