

Problem Set 10

Fall 2014

Issued: Thursday, November 13, 2014

Due: Thursday, November 20, 2014

Problem 1. Midterm 2.

Problem 2. The difficulty of an EE126 exam, Θ , is uniformly distributed on $[0, 100]$, and Alice gets a score X that is uniformly distributed on $[0, \Theta]$. Alice gets his score back and wants to estimate the difficulty of the exam.

- (a) What is the LLSE for Θ ?
- (b) What is the MAP of Θ ?
- (c) Plot two estimates as a function of the score X .
- (d) Find the mean squared error of each estimate as a function of the score X . Plot them.

Problem 3. The random variables X, Y, Z are i.i.d. $\mathcal{N}(0, 1)$.

- (a) Find $L[X^2 + Y^2 | X + Y]$;
- (b) Find $L[X + 2Y | X + 3Y + 4Z]$;
- (c) Find $L[(X + Y)^2 | X - Y]$.

Mini-Lab. Download [Lab10 - GPS.ipynb](#) from course websites. Complete the mini-lab by filling missing code blocks, and working on problems. Submit your `ipynb` file and `pdf` file online.