Optimal Estimation & Filtering **University of Minnesota**
AEM 5451/EE 5251 **September 8, 2020**

PROBLEM SET #1

Due 5:00 P.M., September 22, 2019

Problem 1

Do problem 1.3 in your text.

Problem 2

Do problem 1.4 in your text.

Problem 3

Do problem 1.6 in your text.

Problem 4

Using the matrix inversion lemma, compute the inverse of the matrix P **by hand**.

$$P = \begin{bmatrix} 1 & 2 & 2 \\ 0 & 3 & 1 \\ 0 & 1 & 2 \end{bmatrix}$$

With MATLAB at your disposal, I know that computing the inverse of P is trivial. The point here, however, is not simply computing the inverse of P. Rather, it is for you to become comfortable with block matrices and the matrix inversion lemma. So, try expressing P as sum/product of four matrices A, B, C and D such that the matrix inversion lemma can be used to do the calculations easily by hand.

Problem 5

Do problem 3.13 in your text. Be sure to show your the form of your measurement matrix H for each of the different models.