ECEN 615 Problem Set #5 Fall 2018

Due 11/13/18

1. Book problem 9.1. Assume a linear (dc power flow approximation) system model. That is, **f(x)** = **Hx**.

2. Book problem 9.3. Again assume a linear system model.

3. Do the next two iterations of the two bus, ac (i.e., nonlinear) state estimation example from lecture 19.

4. Using the Givens Rotation algorithm, manually perform a QR factorization of the matrix given below. Show your work at each step.

$$\mathbf{A} = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}$$

5. Using the pseudoinverse approach, use regression to determine the function $y = a + bx + cx^2$ that best fits the xy points (1,1), (2,5), (3,10), (4,6) (5,3). Give the matrix and its pseudoinverse.

6. Using the data for the B7Flat_DC PowerWorld case from Problem Set 4, manually create an equivalent eliminating buses 2, 3, and 6. Give the bus admittance matrix for the modified system, and the impedance of the new equivalent lines.

7. In PowerWorld Simulator using the Aggieland37_HW5 case, first calculate the line flows and bus voltage magnitudes for the contingent opening of both of the transformers between buses 41 and 44. You may wish to store these results in a spreadsheet. Then, reopen the case (i.e., without the contingency) and in PowerWorld create an equivalent eliminating all the buses with bus numbers less than 21. Then, repeat the previous contingency, and compare the results with the full system (obviously only comparing for the retained buses and lines).