ECE 476 – Power System Analysis Fall 2012
Homework 7

Reading: Chapter 6 of textbook
Due Date: Thursday October 25, 2012

Problem 1. Compute the elements of the **third** row of Y_{bus} for the power system in Example 6.9 of textbook.

Problem 2. Given the impedance diagram of a simple system as shown in Figure 1, draw the admittance diagram for the system and develop the 4 x 4 bus admittance matrix Y_{bus} by inspection.

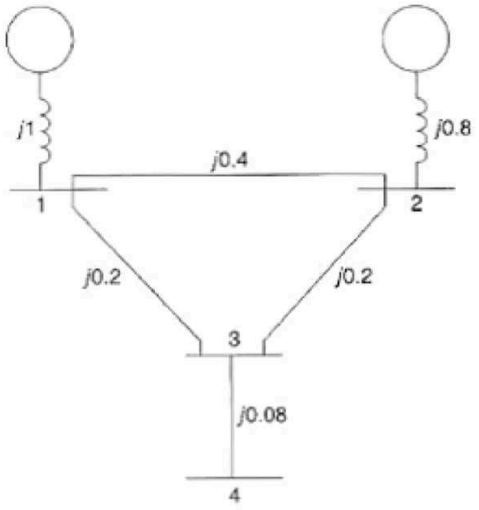

Figure 1: System diagram for problem 2.

Problem 3. A load L consuming 1 p.u. of active power and 0.5 p.u. of reactive power is connected to a generator $G1$ through a short transmission line with $Z' = 0.02 + j0.06$ p.u. Also, there is a capacitor connected to the load bus with admittance $Y_{cap} = j0.25$ p.u. The generator voltage is voltage $V_{G1} = 1\angle 0$.

a) Draw the one line diagram of this system indicating clearly all the elements referenced above.
b) Write the admittance matrix Y_{bus} for this system.
c) Write the power flow equations for this system. **DO NOT SOLVE!**

Problem 4. Use PowerWorld Simulator to modify the Example 6.9 in textbook by inserting a second line between bus 2 and bus 5. Give the new line a circuit identifier of $\widetilde{2}$ to distinguish it from the existing line. The line parameters of the added line should be identical to those of the existing line 2-5. Determine/explain the new line's effect on V_2, the line loadings, and on the total real power losses. Please print a copy of your modified PowerWorld schematic and turn it in.