ECE 524: Homework #2

Due Date: Session 14 (February 17)

Problem 6-1 in text book. Neglect load in motor loads in analytical calculations and reduce circuit to simple RLC circuit. Compare the results for the first 3 cycles at the natural frequency with the resistance neglected to the case with the resistance included.

Simulate the system in your transient program:
(1) of the simplified RLC and LC from the analytical calculations

(2) Model the full system without the loads and simulate. Compare to the results from step (1).

(3) With the motor loads (each motor is 30,000 HP) modelled as a parallel R-L circuit. Treat the non-linear load as an equivalent parallel R-L based of 4.5 MVA at unity power factor. Assume motors operate at pf = 0.8 lagging and 100% efficiency.

(4) again with the motors as voltage behind a reactance. Compare the results between simulations with detailed system model and the simplified one.

Problem 6-2 in text book: Repeat problem 1. Just repeat the analytical calculations and steps (1) and (4) of the simulations. Compare the results to problem 1 (look at natural frequency, peak voltages and currensts).