ECE 331 - Homework #7

AC Synchronous Generators

1) Assume an AC synchronous generator: 75kW, 3 phase, 2-pole, 60Hz, 240V$_{LN}$, Xs = 7.0 Ohms, Ef = 350V.

Find the slip angle, δ, to generate 10kW:

2a) Write a MATLAB or SciLab program which computes the slip angle when given a generation

2b) Using your MATLAB program, plot the slip angle for problem #1 as the power generated varies from 0kW to 50kW.

3) Write a MATLAB or SciLab program which computes the per-phase source current, Ia, given the excitation voltage Ef and the power generated in kW.

4) Assume a power generated of 75kW. Plot the per-phase source curent, Ia, and the phase of Ia as the excitation voltage, Ef, varies from 0V to 500V. (V curve)

5) Assume a power generated of 20kW. Plot the per-phase source curent, Ia, and the phase of Ia as the excitation voltage, Ef, varies from 0V to 500V. (V curve)

6) Assume a power generated of 10kW. Plot the per-phase source curent, Ia, and the phase of Ia as the excitation voltage, Ef, varies from 0V to 500V. (V curve)

(Lab Report)

7) Give the data you collected in the lab

8) Give the model for the AC synchronous generator used in lab.

9) Plot the Voltage Load Line for the AC synchronous generator in the lab.