EE6511 Power System Modelling and Control – Homework Assignment 1

(Total 20 marks)

Submit hardcopy of your answers by Week 6.

Please write your name clearly in your answer sheet.

A cylindrical pole (round rotor) synchronous generator having synchronous reactance of 1 pu and negligible resistance is connected to an infinite bus. The generator delivers an active power of 0.5 pu to the infinite bus and is overexcited with excitation voltage |E| = 1.2 pu. The infinite bus voltage is 1 pu.

a) If the generator reactive power, Q_G increases by 1 percent, calculate how many percents will the prime mover torque change? (8 marks)
b) If the excitation voltage is increased by 10 percent, the corresponding power factor at the generator terminals is found to be 0.9 (lagging). Calculate the generator stator current and the new power angle. (12 marks)