ECEN 667 Fall 2023 Homework 6
Due on Tuesday Nov 21, 2023

1. In the Lecture 18 single cage induction motor example (introduced on slide 16) determine the operating slip if R_r is changed to 0.04 and X_r is changed to 0.05 with the load still consuming 100 MW of real power.

2. Using the case **B2_IndMotor_DoubleCage** use PowerWorld to plot the torque-speed curve. Then vary the induction motor parameters to determine their impact on the torque-speed curve. Which parameters are most important in increasing the starting torque?

3. Book Problem 7.1 using PowerWorld with the case **HW6_Prob_3a** except varying the real and reactive power load at bus 8 in 20 MW increments (with the Mvar scaled as well keeping the initial 2 P/Q ratio) starting at 20 MW until you reach maximum loadability. Plot the voltage at bus 8.

4. Repeat Problem 3, except using the case **HW6_Prob_3b case**, which is similar to the book Problem 7.2 using participation factor AGC control and modeling reasonable reactive power limits.

5. In PowerWorld open **the HW6_Prob5_37BusCLO**D case, which represents the loads at all the buses using the CLOD model discussed in class. The contingency is a nine cycle fault on the line between buses 28 and 31, cleared by opening the line. In the Model Explorer select **Tranisent Stability, Load Characteristics** to view and change the CLOD model parameters. Comment on the impact of varying the percentage of large motors, small motors, discharge lighting and constant power load.

6. In PowerWorld using the case **HW6_Bus37_PV** do PV curve analysis except rather than using the base case, do it what you think is the worst single line contingency (from a PV perspective). Use the case load increment value of 10 MW. You can ignore transmission and transformer flow limits, and bus voltage magnitude limits. Turn in your results.