ELG2331: Experiment 5
Simulation of Shunt-Connected DC Motor
Based on P19.36 and P19.38 Textbook 5th Edition

Part 1

Derive the differential equations describing the electrical and mechanical dynamics of a shunt-connected DC motor. And draw a simulation block diagram of the system. The motor parameters are k_a, k_T = armature and torque reluctance constant and k_f = field flux constant.

Part 2

Develop a Simulink simulator for the above shunt-connected DC motor. Assume the following parameter values: L_a = 0.15 H; L_f = 0.05 H; R_a = 1.8 Ω, R_f= 0.2 Ω; k_a = 0.8 V-s/rad; k_T = 20 N-m/A; k_f= 0.02 Wb/A; b = 0.1 N-m-s/rad; J = 1 kg-m^2.

See Figure P19.36 (5th edition) or Figure P17.35 (4th edition)