

EE380 (Control Systems) Prelab work of Experiment 4.

Student Name	Roll No.	Bench No.

Q.1 Using the values of K_m and τ_m that you determined from the OL step response in Experiment 1, determine the values of B and R_Σ by solving the given two equations.

$$K_m = \frac{K_T}{R_\Sigma B + K_T K_b}, \tau_m = \frac{R_\Sigma J}{R_\Sigma B + K_T K_b}$$

TIP: Write a small (4 – 6 lines) GNU Octave code for doing this calculation as you may be required to do the calculation once again in the lab. Bring the Octave code to the lab.

Q.2 Write down the controller that you designed in Experiment 1. Show the discretized version of this controller.

Q3 Simulate your closed-loop control of motor speed in two ways under this controller using a modification of `easysim.m`:

Q3.1 Using feedback of speed.

Q3.2 Using feedback of current with $\hat{\omega} = \frac{u - R_\Sigma i}{K_b}$,

and plot ω and $\hat{\omega}$ on one figure.