

# EE380 (Control Systems) Pre-Lab work of Experiment 6

Student Name

Roll No.

Bench No.

Q1. Comparison of the DOBs of Figure 6.1

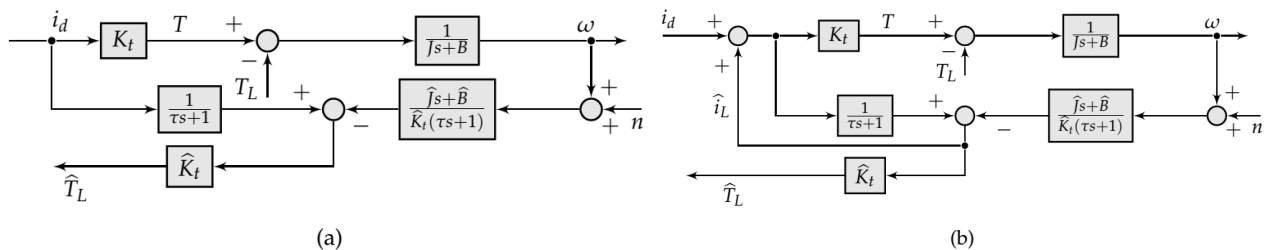


Figure 6.1: (a) Open-loop DOB to estimate  $T_L$ , (b) Closed-loop DOB to estimate  $T_L$ .

1.1. Form the TF from  $T_L$ , to  $\hat{T}_L$ , in each of the block diagrams of Figure 6.1.

1.2. Evaluate the two TFs when  $\tau$  is small. What is the value of  $\tau$ ?

1.3. In which scheme is  $\hat{T}_L$ , closer to  $T_L$  when of  $\hat{J}$ ,  $\hat{B}$ ,  $\hat{K}_t$  are poor estimates?

Q2. Run the SIMULINK file named *dob.mdl* and describe briefly the effect of each of the following changes.

2.1.  $K_\omega(s)$  being the controller you designed in Experiment 1 as opposed to the lag controller shown in *dob.mdl*

2.2. Injecting  $\hat{I}_L$  with a  $-$  instead of  $+$ .

2.3. Breaking the injection of  $\hat{I}_L$ .

2.4. Varying  $\tau$ .

2.5. Varying the plant parameters ( $J, B, K_t$ ) with the respective estimates ( $\hat{J}, \hat{B}, \hat{K}_t$ ) kept constant at their initial values.

Q3. Become acquainted with the files *main-prog-exp6.c* and *easyplot.m*.

Q4. Verify if the controllers that appear in *dob.mdl* have been discretized correctly in *main-prog-exp6.c*.