

## Lab 4 (Speed Control of Servo using PI control):

Pre-Lab: Read sections 3.1 of the SRV02 Workbook and answer the questions in section 3.2 before coming to the lab. The equation that is being referred to in question 1 is Equation 3.1.14.

Lab Experiment:

1. Open the document “SRV02 Quick Setup guide” located in the “Getting Started” folder and follow the instructions to connect the SRV02, VoltPaq, and Q2\_USB data acquisition board.
  - a. Use the black RCA to RCA connector instead of the 2xRCA to 2xRCA cable.
2. In matlab, browse to the folder “C:\Users\Student\Documents\Matlab\SRV02\Controllers\03 - Speed Control”
3. Read through Section 3.3.1.1 in the workbook, **SRV02 Workbook - QUARC (Student).pdf**
  - a. Open s\_srv02\_spd.mdl and the setup file.
  - b. Change the file so that the CONTROL\_TYPE is set to MANUAL and run the script.
  - c. When asked to enter calculated values for  $k_p$  and  $k_i$  in step 1 of the “Closed-loop Response with the PI Controller”, type in the MATLAB command window “kp = ...” and “ki = ...” without the quotes, where ... represents your calculated value for each gain from the pre-lab.
  - d. Run the speed control simulation by following the steps given section 3.3.1.1 and answer all questions asked in this section in your lab report.
4. Read through Section 3.3.1.2 of the workbook, **SRV02 Workbook - QUARC (Student).pdf**, to the run the PI speed control on the SRV02 hardware.
  - a. First configure the HIL initialize block so that the DAQ is q2\_usb.
5. Run the Lead Control Experiments in section 3.3.2. Basically repeat the previous sections with the switch set to the lead compensator.

**Important:** Before closing the model, select “QUARC → Clean all ...” and click “Yes” on the prompt to delete all generated code.

Post-Lab: Write a lab report detailing the procedure and results of the experiments run. Guidelines for writing the lab report can be found in section 3.5 of the SRV02 Workbook.

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