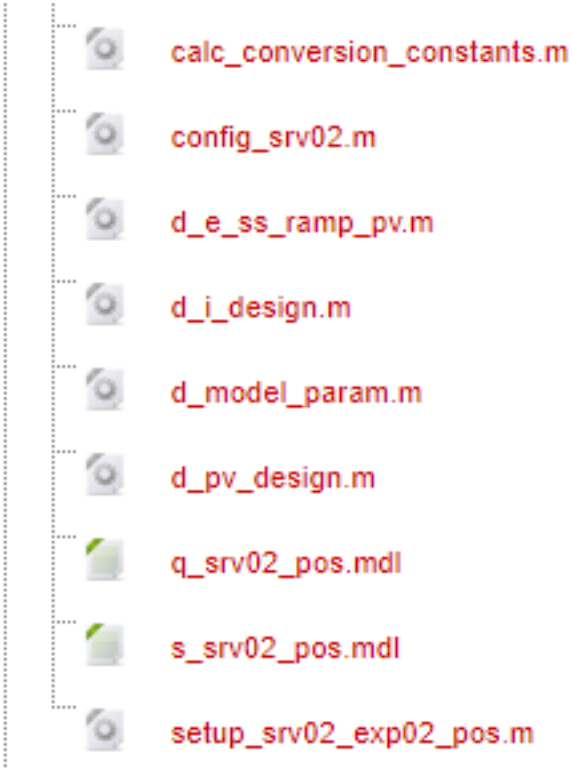
ENG 4550 – Introduction to Control Systems
Lab 3

YORK UNIVERSITÉ UNIVERSITY redefine THE POSSIBLE.

Lab 3: SRV02 Position Control – Step Response Using PV Controller

Lab 3

- In ‘ENG4550 control systems’ on desktop, unzip ‘Lab MatlabSimulink Software-20181001.zip’ to a NEW DIRCTORY. All files you need in Lab 2 are in …/NEW DIRCTORY/Position Control (Labs 3-5)
- When complete, DELETE/REMOVE your files and the FOLDER you created.



Simulation

1. **Configuring the SRV02 according to Section 2.4 in Workbook.**
   - In setup_srv02_exp02_pos.m, make sure CONTROL_TYPE is set to '**MANUAL**'. Run setup_srv02_exp01_mdl.m.
2. **Follow the steps in Section 2.3.1.1 Simulation.**

Experimental test

1. **Configuring the SRV02 according to Section 2.4 in Workbook.**
   - Setup q_srv02_pos.mdl: Double-click on the QUARC HIL Initialize block. Select the data acquisition device (q2_usb or q8_usb) you are using. Click on the **Defaults** and **OK** button.
   - In setup_srv02_exp02_pos.m, make sure CONTROL_TYPE is set to '**MANUAL**'. Run setup_srv02_exp01_mdl.m.
2. **Follow the steps in Section 2.3.1.2 Implementing Step Response using PV Controller.**
   - Before building the model (Step 6), click QUARC -> Set Default Options to avoid the possible target error.

Submission of next lab

1. Lab report (Lab 3)

- Finish your lab report according to the template in Section 2.5.1 and tips in Section 2.5.4.

II. RESULTS

Do not interpret or analyze the data in this section. Just provide the results.

1. Response plot from step 7 in Section 2.3.1.1, *Simulated step response*
2. Response plot from step 11 in Section 2.3.1.1, *Filtered PV response*
3. Response plot from step 8 in Section 2.3.1.2, *Step response of implemented PV controller*
4. Provide applicable data collected in this laboratory (from Table 2.1).

Submission of next lab

Section / Question	Description	Symbol	Value	Unit
Question 4	**Pre-Lab: Model Parameters**			
	Open-Loop Steady-State Gain	K		
	Open-Loop Time Constant	τ		
Question 4	**Pre-Lab: PV Gain Design**			
	Proportional gain	k_p		
	Velocity gain	k_v		
Question 5	**Pre-Lab: Control Gain Limits**			
	Maximum proportional gain	$k_{p,max}$		
Question 6	**Pre-Lab: Ramp Steady-State Error**			
	Steady-state error using PV	e_{ss}		
Question 7	**Pre-Lab: Integral Gain Design**			
	Integral gain	k_i		
2.3.1.1	**Step Response Simulation**			
	Peak time	t_p		
	Percent overshoot	PO		
	Steady-state error	e_{ss}		
2.3.1.1	**Filtered Step Response Using PV**			
	Peak time	t_p		
	Percent overshoot	PO		
	Steady-state error	e_{ss}		
2.3.1.2	**Step Response Implementation**			
	Peak time	t_p		
	Percent overshoot	PO		
	Steady-state error	e_{ss}		