Lab 7 (Modeling Stiffness – Flexible Link):

Pre-Lab: Read section 2 of the Flexible Link Workbook and answer questions 1, 2, 7, and 8 in section 2.2 before coming to the lab. For 7, the equations of motion are as follows

$$\ddot{\theta} = -\frac{B_{eq}}{J_{eq}}\dot{\theta} + \frac{K_s}{J_{eq}}\alpha + \frac{1}{J_{eq}}\tau$$

$$\ddot{\alpha} = \frac{B_{eq}}{J_{eq}}\dot{\theta} - K_s\left(\frac{J_l - J_{eq}}{J_l J_{eq}}\right)\alpha - \frac{1}{J_{eq}}\tau$$

Lab Experiment:

1. Connect the Flexible Link to the SRV02 as shown in the FLEXGAGE User Manual located in C:\User\Student\Matlab\FLEXGAGE\References
2. Connect the SRV02, VoltPaq, and Q2_USB data acquisition board with the following changes.
   a. Do not connect the Tach terminal to the S1&S2 terminal on the SRV02
   b. Connect the red RCA connector to analog input #1 instead of the white one.
   c. Connect the strain gage terminal on the Flexible Link to the S3 terminal of the amplifier.
3. Open q_flexgage_id.mdl and run the experimental setup detailed in section 4.2 of the Flexible Joint Workbook.
4. Open q_flexgage_val.mdl and run the experimental setup detailed in section 4.3 of the workbook.
5. Run the Model Validation experiment in section 2.3.2.
6. Save the data on a USB drive so it can be used in the next lab. The open-loop poles will be needed for the next pre-lab.
7. Questions posed in the lab are to be answered in the lab report. These answers will be required for questions in the next pre-lab.

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 5 of the Flexible Link Workbook.