Aero 2 Recommended Assessment
Measurement and Filtering

Accelerometer Filtering

1. What is the peak amplitude of noise in the first 5 seconds in step 2 of the Accelerometer Filtering section in the Measurement and Filtering – Lab Procedure?

2. What are the likely sources of the large peaks in the Power Spectrum graph in step 3 of the Accelerometer Filtering section in the Measurement and Filtering - Lab Procedure? Justify the frequency you selected to attenuate. Attach your power spectrum graph.

3. What is the transfer function used for the filter in step 4 of the Accelerometer Filtering section in the Measurement and Filtering – Lab Procedure? How does this filtering affect the Power Spectrum graph?

4. What effect does varying the cutoff frequency ω_f have on the filtered response? What is the benefit or trade-off of lowering or increasing this parameter?

Gyroscope

5. How closely does the integrated angle reading from step 2 in the Gyroscope section match the reading from the encoder in step 6 of the Accelerometer Filtering section of the Measurement and Filtering - Lab Procedure? How could the signal from the gyroscope be tuned to make the integrated position reading more accurate? Describe the process that led you to the tuned gyroscope bias.

6. How does the accuracy of the tuned gyroscope position compare to the accelerometer position measurement?