Quanser Aero 2 Recommended Assessment

Rotor Step Response Modelling

1. Plot the step response of the rotor in a MATLAB figure using the saved variables. Make sure the rotor speed and motor voltage are shown. Attach the MATLAB code that was used to generate the plot.
2. Find the steady-state gain, K, of the system from the measured step response. Show your measurements and calculations.
3. Find the time constant, τ, of the system from the measured step response. Show your measurements and calculations.
4. What is the resulting transfer function?
5. Plot the model validation response showing the rotor speed from both the hardware and the model and the input motor voltage.
6. Does your rotor model represent the Aero 2 system well? Explain.
7. How would you have to change the transfer function model you found if it took twice as long for the Aero 2 to reach 63.2% of the steady-state speed?
8. How would you have to change the transfer function model if, after applying the same 10V input to the Aero 2, the steady-state speed was twice what you observed?
9. Is the system stable? Explain using both the model and from your observation running the step response lab.