

## QArm Recommended Assessment

### Low Level Control

1. Based on the performance of your controllers, why would it not be practical to only use a proportional controller?
2. Explain how the Wrist PWM Saturation block and Wrist PWM Rate Limiter work to bring down the joint velocity and joint acceleration. Why it is not safe to operate arms with high velocity and acceleration?
3. Consider a thought experiment – after completely tuning the controllers to meet the desired specifications, remove the rate and saturation limits that were placed, The wrist will dramatically jitter about the target position and not settle. Why would this happen?
4. During the QArm current command lab wrist the amplitude command increased from  $\pm 10$  degrees to  $\pm 40$  degrees. What pattern did you notice in the PWM and current plots? Use screenshots taken during the lab procedure to explain .
5. What causes asymmetric overshoot in Scenarios 2 and 3 in comparison to Scenario 1 as described in the concept review? Use the results of your lab procedure to explain.