

ME360: FUNDAMENTALS OF SIGNAL PROCESSING, INSTRUMENTATION AND CONTROL

Laboratory No. 7 – PID Control and the Parker-Hannifin Hydraulic Station Data Sheet

PID control of a hydraulic piston-cylinder assembly

How does the proportional gain K_p effect the rise time, settling time, overshoot and steady-state error in the response?

Is there an upper limit on K_p above which the control has an adverse effect on the system's response? If yes, describe the adverse effect and give the upper limit value for K_p .

How does the integral gain K_I effect the rise time, settling time, overshoot and steady-state error in the response?

How does the derivative gain K_d effect the rise time, settling time, overshoot and steady-state error in the response?

Record the PID gains to achieve $e_{ss} = 0$, $M_p = 0\%$, $t_r \approx 1.5$ s. Sketch/Plot the actual and desired response and indicate the s.s. error, overshoot (if any), rise time and settling time on your sketch.

Record the PID gains to achieve $e_{ss} = 0$, $M_p = 1\%$, $3.0 \leq t_r \leq 4.0$ s. Sketch the actual and desired response and indicate the s.s. error, overshoot (if any), rise time and settling time on your sketch.