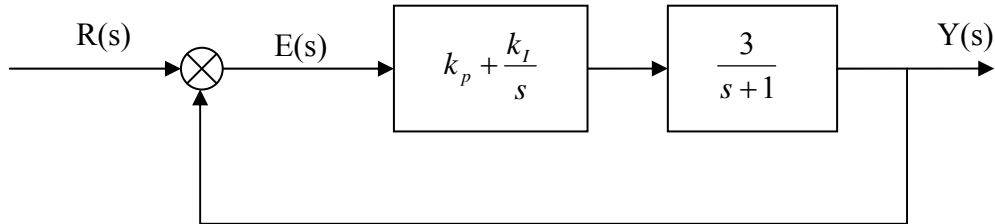


Lesson 28

Problem 28.1

A PI controller is shown below for a first order plant. The proportional gain is k_p and the integrator gain is k_I .



- Determine the closed-loop transfer function as a ratio of simple polynomials and put each in the appropriate standard form.
- Using only the denominator of your transfer function solve for the values of k_p and k_I where the following performance specifications are identically satisfied.
 $\%OS \leq 20\%$ and Peak Time, $T_p \leq 0.2$ s.
- Implement your control system in Simulink and plot the unit step response, $y(t)$. Use the subplot to also plot $e(t)$ below the step response. Note that since there is a numerator polynomial in your closed-loop transfer function, you will not satisfy both performance criteria. Your peak time should be smaller and your overshoot should be higher than you expect.