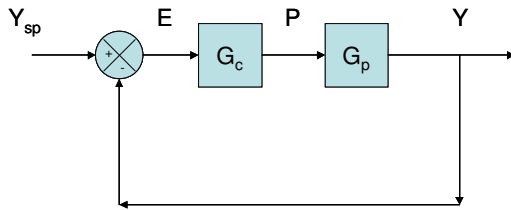


**Ch En 436**  
**Special Problem 13**

Name \_\_\_\_\_



$$G_c = K_c;$$

$$G_p = \frac{0.5}{(s+1)(0.5s+1)}$$

For the above system, answer the following questions:

1. What is the overall transfer function relating  $Y$  to  $Y_{sp}$ ?
2. Will  $Y$  exhibit underdamped, overdamped, or critically damped response for  $K_c$  values of 0.16, 0.25, and 0.50?
3. Is there a value of  $K_c$  that will cause  $(Y/ Y_{sp})$  to show unstable response?
4. Is the value that causes an unstable response a reverse acting or a direct acting controller?
5. Make a root locus diagram for this system with values of  $K_c$  ranging from -3 to 3.