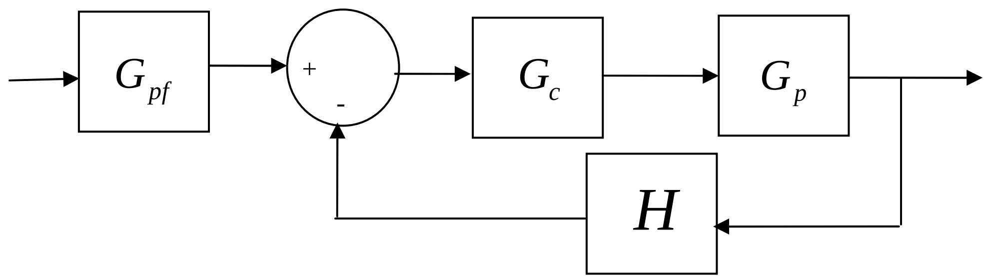
Name ______________________________ CM_______________

ECE-320, Quiz #6

Problems 1-4 refer to the following system



1) To reduce the sensitivity of the closed loop transfer function to variations in the prefilter G_{pf}, we should

a) make $|G_c(j\omega)G_p(j\omega)H(j\omega)|$ large b) make $|G_c(j\omega)G_p(j\omega)H(j\omega)|$ small

c) make G_{pf} small d) do nothing, we cannot change the sensitivity

2) To reduce the sensitivity of the closed loop transfer function variations in the plant G_p, we should

a) make $|G_c(j\omega)G_p(j\omega)H(j\omega)|$ large b) make $|G_c(j\omega)G_p(j\omega)H(j\omega)|$ small

c) make G_{pf} large d) do nothing, we cannot change the sensitivity

3) To reduce the sensitivity of the closed loop transfer function variations in the controller G_c, we should

a) make $|G_c(j\omega)G_p(j\omega)H(j\omega)|$ large b) make $|G_c(j\omega)G_p(j\omega)H(j\omega)|$ small

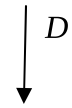
c) make $|H(j\omega)|$large d) do nothing, we cannot change the sensitivity

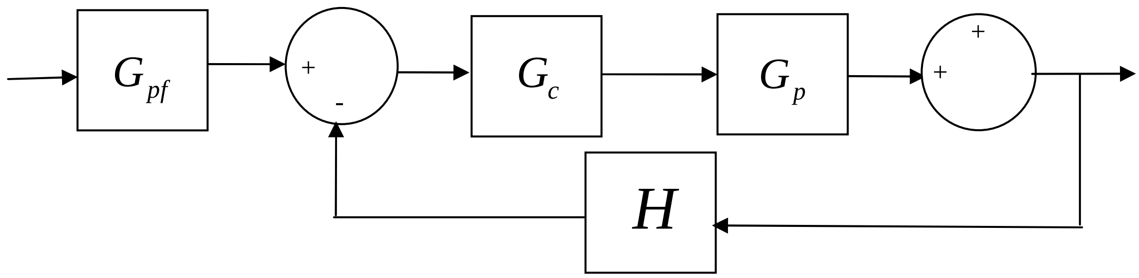
4) To reduce the sensitivity of the closed loop transfer function to variations in the sensor H, we should

a) make $|G_c(j\omega)G_p(j\omega)H(j\omega)|$ large b) make $|G_c(j\omega)G_p(j\omega)H(j\omega)|$ small

c) make G_{pf} large d) do nothing, we cannot change the sensitivity

5) For the system below



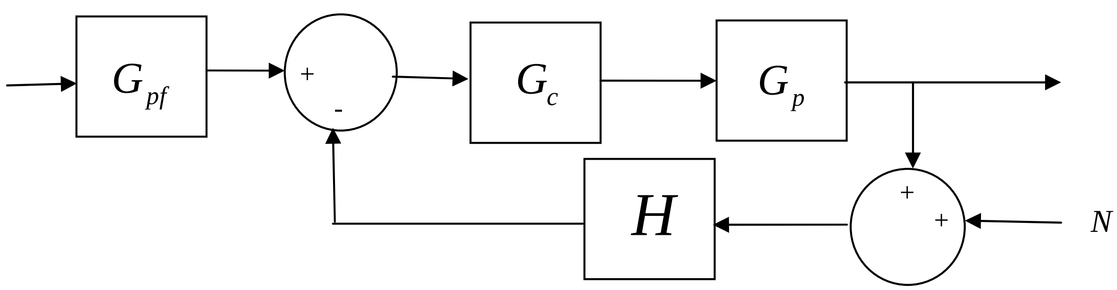


to reduce the effects of the external disturbance D on the system output, we should

a) make $|G_c(j\omega)G_p(j\omega)H(j\omega)|$ large b) make $|G_c(j\omega)G_p(j\omega)H(j\omega)|$ small

c) make G_{pf} large d) do nothing, we cannot change the sensitivity

6) For the system below

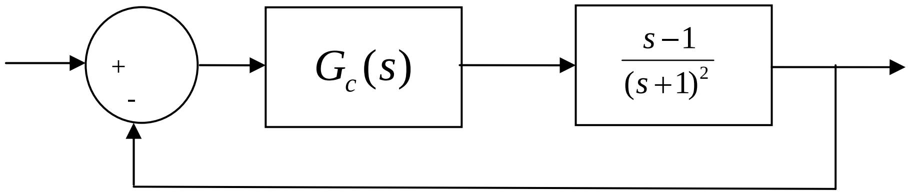


to reduce the effects of sensor noise N on the closed loop system , we should

a) make $|G_c(j\omega)G_p(j\omega)H(j\omega)|$ large b) make $|G_c(j\omega)G_p(j\omega)H(j\omega)|$ small

c) make $|H(j\omega)|$ large d) do nothing, we cannot change the sensitivity

Problems 7 -10 refer the following system, where we are going to use the Diophantine equations to place the closed loop poles. We assume we want the closed loop poles to be stable.



7) If we want the minimum order controller to place the closed loop poles (and have a type 0 system), the controller will have which of the following forms

a) $G_c(s) = \frac{B_0}{A_0}$ b) $G_c(s) = \frac{B_0 + B_1 s}{A_0 + A_1 s}$ c) $G_c(s) = \frac{B_0 + B_1 s + B_2 s^2}{A_0 + A_1 s + A_2 s^2}$

d) $G_c(s) = \frac{B_0 + B_1 s + B_2 s^2 + B_3 s^3}{A_0 + A_1 s + A_2 s^2 + A_3 s^3}$

8) If we use the minimum order controller to place the closed loop poles (and have a type 0 system), how many closed loop poles will the system have?

a) 1 b) 2 c) 3 d) 4

9) If we want the minimum order controller to place the closed loop poles and have a type 1 system, the controller will have which of the following forms?

a) $G_c(s) = \frac{B_0}{A_0}$ b) $G_c(s) = \frac{B_0 + B_1 s}{A_1 s}$ c) $G_c(s) = \frac{B_0 + B_1 s + B_2 s^2}{A_1 s + A_2 s^2}$

d) $G_c(s) = \frac{B_0 + B_1 s + B_2 s^2 + B_3 s^3}{A_1 s + A_2 s^2 + A_3 s^3}$

10) If we use the minimum order controller to place the closed loop poles and have a type 1 system, how many closed loop poles with the system have?

a) 1 b) 2 c) 3 d) 4