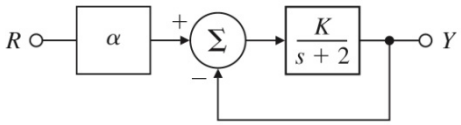
ESE 406/505 & MEAM 513 – 2011-Mar-21 – Quiz – Name:_____

- Choose the one best answer for each question by circling the letter.
- A correct answer is worth 2 points.
- No answer is worth 0 points.
- An incorrect answer is worth -1 point. Random guessing will lower your score, on average.

1. In the block diagram shown at the right, which of the following is the "loop transfer function," G(s), that we have been discussing in class?

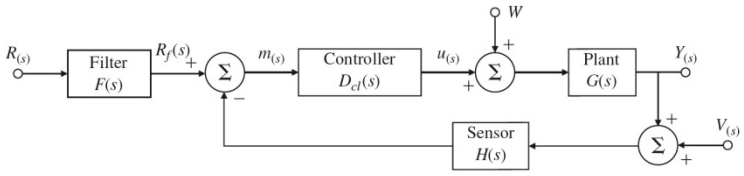


   A. $G(s) = \dfrac{K}{s+2}$

   B. $G(s) = \dfrac{\alpha K}{s+2}$

   C. $G(s) = \dfrac{K}{s+2+K}$

   D. $G(s) = \dfrac{\alpha K}{s+2+K}$



2. Which of the following is MOST CORRECT concerning the block diagram shown at right?
   A. Good tracking of user inputs, R(s), requires H(s) to be large (much larger than 1) at high frequencies.
   B. Good tracking requires H(s) to be small (much smaller than 1) at low frequencies.
   C. Good rejection of disturbances, W(s), requires H(s) to be small (much smaller than 1).
   D. None of the other answers is substantially correct.

3. In the figure above, if F(s)=H(s)=1, what is the MOST CORRECT requirement to achieve good rejection of disturbances, W(s)?

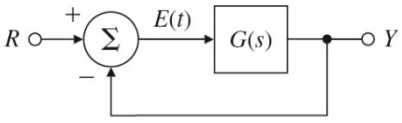
   A. $\left|\dfrac{G(s)}{1+D_{cl}(s)G(s)}\right| \ll 1$

   B. $\left|\dfrac{D_{cl}(s)G(s)}{1+D_{cl}(s)G(s)}\right| \ll 1$

   C. $\left|D_{cl}(s)G(s)\right| \ll 1$

   D. $\left|G(s)\right| \ll 1$

4. Suppose that the system shown in the figure at right has reached neutral stability and exhibits sustained oscillations at some frequency, ω. From this observation, we can infer that…



   A. $G(j\omega) \to \infty$

   B. $G(j\omega) = 0$

   C. $G(j\omega) = -1$

   D. $\dfrac{G(j\omega)}{1+G(j\omega)} = 0$

5. Which of the following is LEAST ACCURATE?
   A. The *response bandwidth* is a measure of the maximum frequency at which the response tracks the command.
   B. The *response bandwidth* is often defined as the frequency at which the gain of the closed-loop transfer function is -3dB.
   C. The *crossover frequency* is the frequency at which the loop gain has magnitude of 0dB.
   D. The *crossover frequency* is the frequency at which the loop gain has phase of 0 deg.