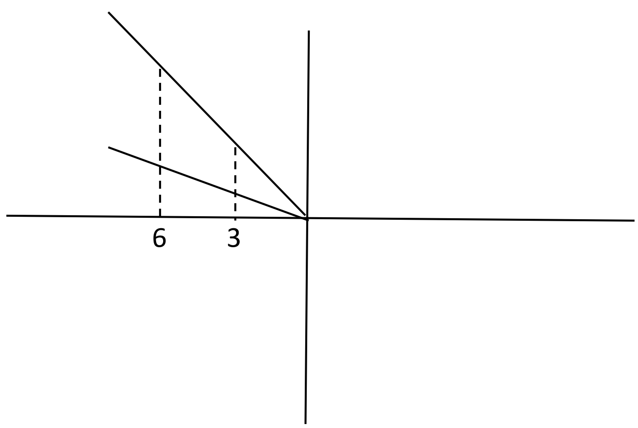
Tarea#4 Alejandro Rodriguez Saenz

Control Automatico

II Cuatrimestre, 2018

Del siguiente sistema encuentre:

1. Coeficiente de amortiguamiento y frecuencia natural para cada intersección.
2. Mp para cada intersección
3. Proponer un sistema con retroalimentación negativa.



1. Punto a:

$$\zeta = \cos(30) = \frac{\sqrt{3}}{2}$$

$$\zeta\omega_n = 3 \quad \omega_n = \frac{3}{\frac{\sqrt{3}}{2}} = 2\sqrt{3}$$

$$M = -e^{-\left(\frac{\zeta\pi}{\sqrt{1-\zeta}}\right)} = 4.33x10^{-3}$$

$$\frac{{\omega_n}^2}{s^2 + 2\zeta\omega_n + {\omega_n}^2} = \frac{12}{s^2 + 6s + 12}$$

$$t = \frac{4}{\zeta\omega_n} = 4/3$$

$$Feedback = \frac{f(x)}{g(x)} = \frac{f(x)}{g(x) + f(x)}$$

$$f(x) = \frac{12}{s^2 + 6s}$$

$$g(x) = 1$$

2. Punto b:

$$\zeta = \cos(60) = \frac{1}{2}$$

$$\zeta\omega_n = 3 \quad \omega_n = \frac{3}{\frac{1}{2}} = 6$$

$$M = -e^{-\left(\frac{\zeta\pi}{\sqrt{1-\zeta}}\right)} = 0.163$$

$$\frac{{\omega_n}^2}{s^2 + 2\zeta\omega_n + {\omega_n}^2} = \frac{36}{s^2 + 6s + 36}$$

$$t = \frac{4}{\zeta\omega_n} = 4/3$$

$$Feedback = \frac{f(x)}{g(x)} = \frac{f(x)}{g(x) + f(x)}$$

$$f(x) = \frac{36}{s^2 + 6s}$$

$$g(x) = 1$$

3. Punto c:

$$\zeta = \cos(30) = \frac{\sqrt{3}}{2}$$

$$\zeta\omega_n = 6 \quad \omega_n = \frac{6}{\frac{\sqrt{3}}{2}} = 4\sqrt{3}$$

$$M = -e^{-\left(\frac{\zeta\pi}{\sqrt{1-\zeta}}\right)} = 4.33x10^{-3}$$

$$\frac{\omega_n{}^2}{s^2 + 2\zeta\omega_n + \omega_n{}^2} = \frac{48}{s^2 + 12s + 48}$$

$$t = \frac{4}{\zeta\omega_n} = 4/6$$

$$Feedback = \frac{f(x)}{g(x)} = \frac{f(x)}{g(x) + f(x)}$$

$$f(x) = \frac{48}{s^2 + 12s}$$

$$g(x) = 1$$

4. Punto d:

$$\zeta = \cos(60) = \frac{1}{2}$$

$$\zeta\omega_n = 6 \quad \omega_n = \frac{6}{\frac{1}{2}} = 12$$

$$M = -e^{-\left(\frac{\zeta\pi}{\sqrt{1-\zeta}}\right)} = 0.163$$

$$\frac{\omega_n{}^2}{s^2 + 2\zeta\omega_n + \omega_n{}^2} = \frac{144}{s^2 + 12s + 144}$$

$$t = \frac{4}{\zeta\omega_n} = 4/6$$

$$Feedback = \frac{f(x)}{g(x)} = \frac{f(x)}{g(x) + f(x)}$$

$$f(x) = \frac{144}{s^2 + 12s}$$

$$g(x) = 1$$