Tarea #4

Moises Romero Hernández

Prof: Ing. Erick Salas

Se procede averiguar ζ con la ecuación: $\zeta = \cos(\theta)$

Para $\theta = 30°$

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

para $\theta = 60°$

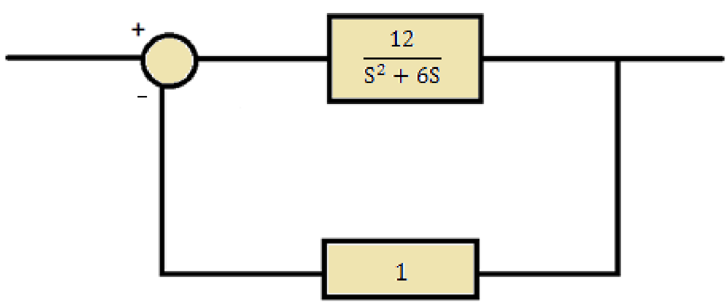
$$\zeta = \cos 60 \ \rightarrow \ \zeta = \frac{1}{2}$$

Se procede averiguar Wn con la fórmula: $\mathrm{Wn} = \frac{\propto}{\zeta}$, posterior a esto dado ζ y Wn obtenemos su función de transferencia y diagrama de bloques para cada punto

- Para $\alpha = 3$ y $\zeta = \frac{\sqrt{3}}{2}$

$$\mathrm{Wn} = \frac{3}{\frac{\sqrt{3}}{2}} \rightarrow \mathrm{Wn} = 2\sqrt{3}$$

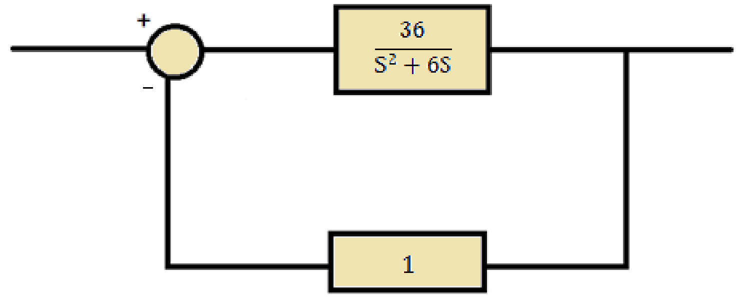
$$\mathrm{G0} = \frac{12}{S^2 + 2 * 2\sqrt{3} * \frac{\sqrt{3}}{2} + 12} \rightarrow \frac{12}{S^2 + 6S + 12} \rightarrow \frac{12}{S^2 + 6S}$$



- Para $\alpha = 3$ y $\zeta = \frac{1}{2}$

$$Wn = \frac{3}{\frac{1}{2}} \rightarrow Wn = 6$$

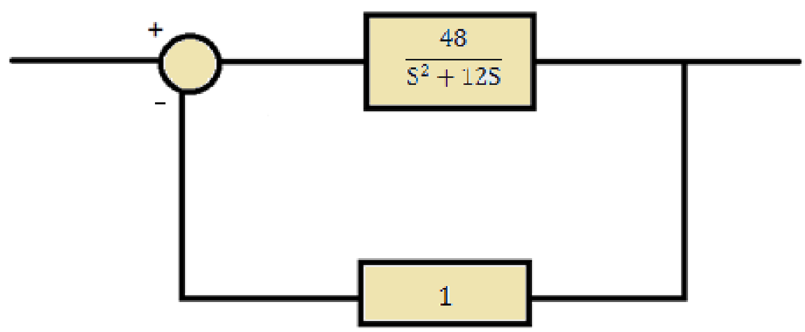
$$H0 = \frac{6^2}{S^2 + 6 * \frac{1}{2} * 2 + 6^2} \rightarrow \frac{36}{S^2 + 6S + 36} \rightarrow \frac{36}{S^2 + 6S}$$



- Para $\alpha = 6$ y $\zeta = \frac{\sqrt{3}}{2}$

$$Wn = \frac{6}{\frac{\sqrt{3}}{2}} \rightarrow Wn = 4\sqrt{3}$$

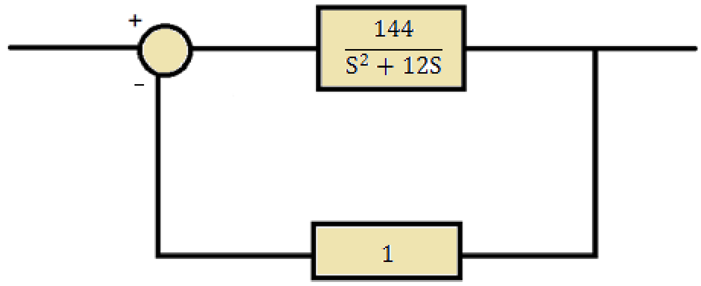
$$F0 = \frac{6.298^2}{S^2 + 2 * 4\sqrt{3} * \frac{\sqrt{3}}{2} S + 6.298^2} \rightarrow \frac{48}{S^2 + 12S + 48} \rightarrow \frac{48}{S^2 + 12S}$$



- Para $\alpha = 6$ y $\zeta = \frac{1}{2}$

$$Wn = \frac{6}{\frac{1}{2}} \rightarrow Wn = 12$$

$$A0 = \frac{12^2}{S^2 + 2 * \frac{1}{2} * 12 * S + 12^2} \rightarrow \frac{144}{S^2 + 12S + 144} \rightarrow \frac{144}{S^2 + 12S}$$



2.se obtuvieron los valores de Mp basados en la formula $Mp = e^{-\left(\frac{\zeta \cdot \pi}{\sqrt{1-\zeta^2}}\right)}$

- Para $\zeta = \frac{\sqrt{3}}{2}$

$$Mp = e^{-\left(\frac{\zeta \cdot \pi}{\sqrt{1-\zeta^2}}\right)} \quad \rightarrow \quad Mp = e^{-\left(\frac{\frac{\sqrt{3}}{2} \cdot \pi}{\sqrt{1-\frac{\sqrt{3}}{2}^2}}\right)} \quad \rightarrow \quad Mp = 4{,}33x10^{-3}$$

- Para $\zeta = \frac{1}{2}$

$$Mp = e^{-\left(\frac{\zeta \cdot \pi}{\sqrt{1-\zeta^2}}\right)} \quad \rightarrow \quad Mp = e^{-\left(\frac{\frac{1}{2} \cdot \pi}{\sqrt{1-\frac{1}{2}^2}}\right)} \quad \rightarrow \quad Mp = 0{,}16$$

1. Obtener $T_{s_{2\%}}$ con la siguiente formula $T_{s_{2\%}} = \frac{4}{\zeta \cdot \mathrm{Wn}}$

- Para $\zeta = \frac{\sqrt{3}}{2}$, $\mathrm{Wn} = 2\sqrt{3}$

$$T_{s_{2\%}} = \frac{4}{\zeta \cdot \mathrm{Wn}} \quad \rightarrow \quad T_{s_{2\%}} = \frac{4}{\frac{\sqrt{3}}{2} \cdot 2\sqrt{3}} \quad \rightarrow \quad T_{s_{2\%}} = \frac{4}{3}$$

- Para $\zeta = \frac{\sqrt{3}}{2}$, $\mathrm{Wn} = 4\sqrt{3}$

$$T_{s_{2\%}} = \frac{4}{\zeta \cdot \mathrm{Wn}} \quad \rightarrow \quad T_{s_{2\%}} = \frac{4}{\frac{\sqrt{3}}{2} \cdot 4\sqrt{3}} \quad \rightarrow \quad T_{s_{2\%}} = \frac{2}{3}$$

- Para $\zeta = \frac{1}{2}$, $\mathrm{Wn} = 6$

$$T_{s_{2\%}} = \frac{4}{\zeta \cdot \mathrm{Wn}} \quad \rightarrow \quad T_{s_{2\%}} = \frac{4}{\frac{1}{2} \cdot 6} \quad \rightarrow \quad T_{s_{2\%}} = \frac{4}{3}$$

- Para $\zeta = \frac{1}{2}$, $\mathrm{Wn} = 12$

$$T_{s_{2\%}} = \frac{4}{\zeta \cdot \mathrm{Wn}} \quad \rightarrow \quad T_{s_{2\%}} = \frac{4}{\frac{1}{2} \cdot 12} \quad \rightarrow \quad T_{s_{2\%}} = \frac{2}{3}$$