1. Obtener ζ con la siguiente formula $\zeta = \cos(\theta)$

- Para $\theta = 30°$

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

- Para $\theta = 60°$

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

2. Obtener Wn con la siguiente formula $\mathrm{Wn} = \frac{\alpha}{\zeta}$

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

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

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

$$\mathrm{Wn} = \frac{\alpha}{\zeta} \quad \rightarrow \quad \mathrm{Wn} = \frac{3}{\frac{1}{2}} \quad \rightarrow \quad \mathrm{Wn} = 6$$

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

$$\mathrm{Wn} = \frac{\alpha}{\zeta} \quad \rightarrow \quad \mathrm{Wn} = \frac{6}{\frac{\sqrt{3}}{2}} \quad \rightarrow \quad \mathrm{Wn} = 4\sqrt{3}$$

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

$$\mathrm{Wn} = \frac{\alpha}{\zeta} \quad \rightarrow \quad \mathrm{Wn} = \frac{6}{\frac{1}{2}} \quad \rightarrow \quad \mathrm{Wn} = 12$$

3. Obtener Mp con la siguiente 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 $\zeta = \frac{1}{2}$

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

4. 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 $\zeta = \frac{1}{2}$, $\mathrm{Wn} = 6$

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

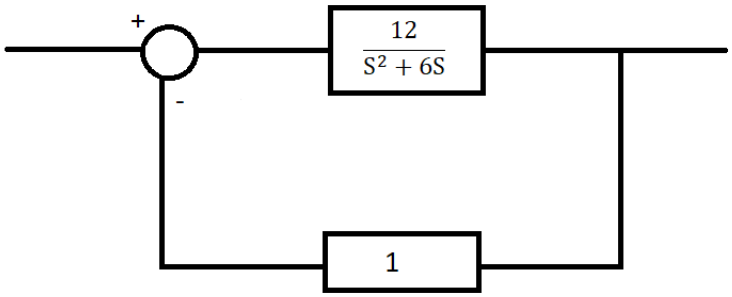
- Para $\zeta = \frac{1}{2}$, $\mathrm{Wn} = 12$

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

5. Función de transferencia y sistema de bloques

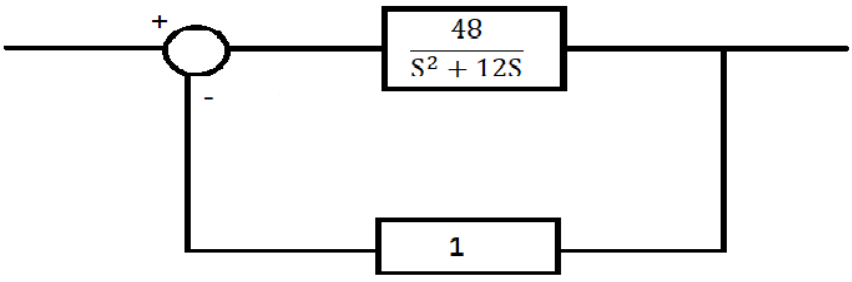
- Para $\zeta = \frac{\sqrt{3}}{2}$, $\mathrm{Wn} = 2\sqrt{3}$

$$G_0 = \frac{2\sqrt{3}^2}{\mathrm{S}^2 + 2 \cdot 2\sqrt{3} \cdot \frac{\sqrt{3}}{2}\mathrm{s} + 12} \rightarrow \frac{12}{\mathrm{S}^2 + 6\mathrm{S} + 12} \rightarrow \frac{12}{\mathrm{S}^2 + 6\mathrm{S}}$$



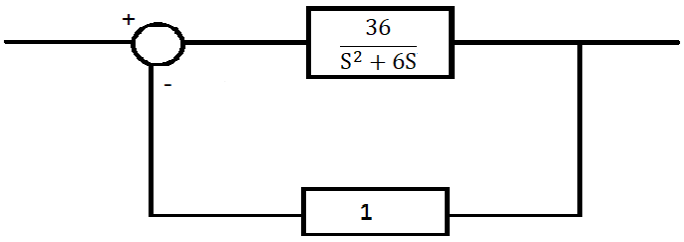
- Para $\zeta = \frac{\sqrt{3}}{2}$, $\mathrm{Wn} = 4\sqrt{3}$

$$F_0 = \frac{4\sqrt{3}^2}{\mathrm{S}^2 + 2 \cdot 4\sqrt{3} \cdot \frac{\sqrt{3}}{2}\mathrm{S} + 6.298^2} \rightarrow \frac{48}{\mathrm{S}^2 + 12\mathrm{S} + 48} \rightarrow \frac{48}{\mathrm{S}^2 + 12\mathrm{S}}$$



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

$$G_1 = \frac{6^2}{S^2 + 6 \cdot \frac{1}{2} \cdot 2s + 6^2} \rightarrow \frac{36}{S^2 + 6S + 36} \rightarrow \frac{36}{S^2 + 6S}$$



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

$$F_1 = \frac{12^2}{S^2 + 2 \cdot \frac{1}{2} \cdot 12 \cdot S + 12^2} \rightarrow \frac{144}{S^2 + 12S + 144} \rightarrow \frac{144}{S^2 + 12S}$$