

Demostación

Demstrar que un sistema que opera a 16% de overshoot

$$0,16 = e^{-\frac{4\pi}{\sqrt{1-\zeta^2}}}$$

$$0,16 = e^{\left(\frac{-4\pi}{\sqrt{1-\zeta^2}}\right)}$$

$$\ln(0,16) = \frac{-4\pi}{\sqrt{1-\zeta^2}}$$

$$[\ln(0,16)]^2 = \frac{(4\pi)^2}{1-\zeta^2}$$

$$(1-\zeta^2)[\ln(0,16)]^2 = \zeta^2 \pi^2$$

$$[\ln(0,16)]^2 - \zeta^2 [\ln(0,16)]^2 - \zeta^2 \pi^2 = 0$$

$$\zeta^2 ([\ln(0,16)]^2 - \pi^2) + [\ln(0,16)]^2 = 0$$

$$\zeta^2 = \frac{[\ln(0,16)]^2}{\pi^2 + [\ln(0,16)]^2}$$

$$\zeta = \sqrt{\frac{[\ln(0,16)]^2}{\pi^2 + [\ln(0,16)]^2}} \approx 0,5037$$

$$\cos(\phi) = 0,5037$$

