Tarea Fracciones parciales

$$\rightarrow \boxed{\frac{9}{s^2+2s+9}} \rightarrow$$

$w_n = 3$

$2\zeta w_n s = 2s$

$\zeta = \frac{1}{3}$ sub amortiguado

$$\frac{-2 \pm \sqrt{2^2 - 4 \cdot 1 \cdot 9}}{2} = \frac{-2 \pm \sqrt{-32}}{2} \qquad S_1 = -1 + 2,83j \quad S_2 = -1 - 2,83j$$

$$\frac{A}{s} + \frac{B}{\underset{(d)}{(s+1-2,83j)}} + \frac{C}{\underset{(e)}{s+1+2,83j}} = \frac{9}{s(d)(e)}$$

$$A(s+1-2,83j)(s+1+2,83j) + B(s+1+2,83j) + C(s+1-2,83j) = 9$$

$s=0 \quad A(1-2,83j)(1+2,83j) = 9$

$A = 1 \quad s = -1+2,83j$

$B(-1+2,83j)(-1+2,83j+1+2,83j) = 9$

$B = -0,5 + 0,18j$

$s = -1-2,83j \quad C(-1-2,83j)(-1-2,83j+1-2,83j) = 9$

$C = -0,5 - 0,18j$

$$= \frac{1}{s} + \frac{-0,5+0,18j}{(s+1-2,83j)} + \frac{(-0,5-0,18j)}{(s+1+2,83j)}$$

$$\frac{1}{s+\alpha-\beta j} = e^{-\alpha t}\cos(\beta t) + j e^{-\alpha t}\,\mathrm{sen}(\beta t)$$

$$y(t) = 1 + (-0,5+0,18j)(e^{-t}\cos(2,83t) + j e^{-t}\,\mathrm{sen}(2,83t))$$
$$+ (-0,5-0,18j)(e^{-t}(\cos(-2,83t) + j e^{-t}\,\mathrm{sen}(-2,83t))$$

$$\cos(\alpha) = \cos(-\alpha), \quad \mathrm{sen}(-\alpha) = -\mathrm{sen}(\alpha)$$

$$y(t) = -e^{-t}\cos(2,83t) - j e^{-t}\,\mathrm{sen}(-2,83t) - 0,36 e^{-t}\,\mathrm{sen}(2,83t) + 1$$

$y(t) = e^{-t}\cos(2{,}83t) - 0{,}36\, e^{-t}\operatorname{sen}(2{,}83t) + 1$

$G(s) = \dfrac{9}{s^2+9} \rightarrow \omega_n = 3$

$2\zeta\omega_n s = \emptyset$

$\zeta = \emptyset \rightarrow$ oscilador

$\dfrac{1}{s}\,\dfrac{9}{s^2+9} = \dfrac{9}{s^3+9s}$

$G(s) = \dfrac{9}{s(s+3j)(s-3j)}$

$s^2+9=\emptyset \quad s_1 = 3j$

$s_2 = -3j$

$\dfrac{A}{s} + \dfrac{B}{(s+3j)} + \dfrac{C}{s-3j} = \dfrac{9}{s(s+3j)(s-3j)}$

$A(s+3j)(s-3j) + B(s)(s-3j) + C(s)(s+3j) = 9$

$s = \emptyset, \quad A(3j)(-3j)\,9 \quad A = 1$

$s = -3j \quad B(-3j)(-3j-3j) = 9 \quad B = 1/2$

$s = 3j \quad C(3j(3j+3j)) = 9 \quad C = -1/2$

$G(s) = \dfrac{1}{s} - \dfrac{0{,}5}{s+3j} - \dfrac{0{,}5}{s-3j} \xrightarrow{\mathcal{L}^{-1}} \dfrac{1}{s+\alpha-\beta j} = e^{-\alpha t}\cos(\beta t) \pm j e^{-\alpha t}\operatorname{sen}(\beta t)$

$= 1 - 0{,}5(\cos(3t) + j\operatorname{sen}(3t)) - 0{,}5(\cos(-3t)\operatorname{sen}(-3t))$

$\cos(\alpha) = \cos(-\alpha), \quad \operatorname{sen}(-\alpha) = -\operatorname{sen}(\alpha)$

$y(t) = 1 - \cos(3t)$