

Parte 2)

RESPOSTA
NATURAL

$$a) \quad \frac{d^2 y(t)}{dt^2} + 6 \frac{dy(t)}{dt} + 2y(t) = 0$$

$$y(0) = 10$$

$$y'(0) = 6$$

$\Downarrow L$

$$\lambda (\lambda y(\lambda) - 10) - 6 + 6(\lambda y(\lambda) - 10) + 2y(\lambda) = 0$$

$$\lambda^2 y(\lambda) - 10\lambda - 6 + 6\lambda y(\lambda) - 60 + 2y(\lambda) = 0$$

$$y(\lambda) = \frac{10\lambda + 66}{\lambda^2 + 6\lambda + 2} = \frac{K_1}{(\lambda + 5,6457)} + \frac{K_2}{(\lambda + 0,3542)}$$

$$\frac{10\lambda + 66 \cdot (\lambda + 5,6457)}{(\lambda + 5,6457)(\lambda + 0,3542)} = \frac{K_1 \cdot (\lambda + 5,6457)}{(\lambda + 5,6457)} + \frac{K_2 (\lambda + 5,6457)}{(\lambda + 0,3542)}$$

onde $\lambda = -5,6457 \rightarrow K_2 = 0$

$$\frac{10(-5,6457) + 66}{(-5,6457 + 0,3542)} = K_1 + 0 \rightarrow K_1 = -1,8034$$

$$\frac{10\lambda + 66 (\lambda + 0,3542)}{(\lambda + 5,6457)(\lambda + 0,3542)} = \frac{K_1 (\lambda + 0,3542)}{(\lambda + 5,6457)} + \frac{K_2 (\lambda + 0,3542)}{(\lambda + 0,3542)}$$

onde $\lambda = -0,3542 \rightarrow K_1 = 0$

$$\frac{10(-0,3542) + 66}{(-0,3542 + 5,6457)} = 0 + K_2 \rightarrow K_2 = 11,8034$$

$$y_m(t) = (-1,8034 e^{-5,6457t} + 11,8034 e^{-0,3542t}) u(t)$$