Clase 23 de noviembre de 2021

Elevadores de los edificios muy altos

TORRE MAYOR CD MX.

$h = 225$ m. 55 pisos

por computadora

sacudida ≤ 1.6 ft/s^3 $= 0.49$ m/s^3

$s = \frac{da}{dt}$ aceleración $\frac{d^2y}{dt^2}$

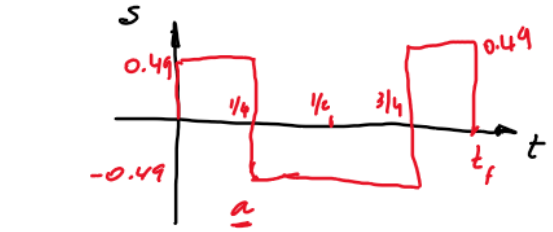
$s = \frac{d^3y}{dt^3}$

$t_f = 24.5$ s

$\frac{d^3y}{dt^3} = s$

cond. final: $y(t_f) = 225$, $y'(t_f) = 0$, $y''(t_f) = 0$

cond. iniciales: $y(0) = 0$, $y'(0) = 0$, $y''(0) = 0$



TEMA 4.-

EDenDP (2) $\longrightarrow$ $\frac{\partial^2 z}{\partial x^2} + 3\frac{\partial^2 z}{\partial x \partial y} + 2\frac{\partial^2 z}{\partial y^2} = 0$

En este caso el orden de cada término es igual = 2

$z = F(y + mx)$

$\frac{\partial z}{\partial x} = mF'$ $\quad \frac{\partial z}{\partial y} = F'$

$\frac{\partial^2 z}{\partial x^2} = m^2F''$ $\quad \frac{\partial^2 z}{\partial y^2} = F''$ $\quad \frac{\partial^2 z}{\partial x \partial y} = mF''$

$m^2F'' + 3mF'' + 2F'' = 0$

$(m^2 + 3m + 2)F'' = 0$

Ecuac. Caract. $\rightarrow$ $m^2 + 3m + 2 = 0$

Solución Trivial $F'' = 0$

$F' = C_1$

$F = C_1(y + mx) + C_2$

$$m = \frac{-3 \pm \sqrt{9 - 4(1)(2)}}{2(1)}$$

$$m = \frac{-3 \pm \sqrt{1}}{2} \Rightarrow \begin{matrix} m_1 = -2 \\ m_2 = -1 \end{matrix}$$

$$z(x,y) = F_1(y-x) + F_2(y-2x)$$

$$z_p(x,y) = \cos(y-x) + 5\,\text{sen}(y-2x)$$

$$\frac{\partial^2 z}{\partial x^2} + 3\frac{\partial^2 z}{\partial x \partial y} + 2\frac{\partial^2 z}{\partial y^2} = 0$$

$$\frac{\partial^2 z}{\partial x^2} = -\cos(y-x) + 20\,\text{sen}(y-2x)$$

$$+\quad 2\frac{\partial^2 z}{\partial y^2} = -2\cos(y-x) + 10\,\text{sen}(y-2x)$$

$$3\quad \frac{\partial^2 z}{\partial x \partial y} = 3\cos(y-x) - 30\,\text{sen}(y-2x)$$

$$0 = (0)\cos(y-x) + (0)\,\text{sen}(y-2x)$$

$$0 \equiv 0$$