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ISIENGO2 1019

COMPUTER ENGINEERING

ENIG 351

Assignment 2

$$d^2y + 4dy + 5y = 6 \sin \theta$$

$$m^2 + 4m + 5 = 0$$

$$= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-4 \pm \sqrt{4^2 - 4(1)(5)}}{2(1)}$$

$$= \frac{-4 \pm \sqrt{16 - 20}}{2}$$

$$= \frac{-4 \pm \sqrt{-4}}{2}$$

$$= \frac{-4 \pm j \cdot 2}{2}$$

$$= \frac{-4 \pm 2j}{2}$$

$$= -2 \pm j$$

C.F.:

$$y = e^{-2\theta} (C \cos \theta + D \sin \theta)$$

P.I.

$$y = C \cos \theta + D \sin \theta$$

$$y = C \cos \theta + D \sin \theta$$

$$\frac{dy}{d\theta} = -C \sin \theta + D \cos \theta$$

d

$$(-C \cos \theta - D \sin \theta) + 4(-C \sin \theta + D \cos \theta) + 5(C \cos \theta + D \sin \theta) = 6 \sin \theta$$

$$-C \cos \theta - D \sin \theta - 4C \sin \theta + 4D \cos \theta + 5C \cos \theta + 5D \sin \theta = 6 \sin \theta$$

$$(-C + 4D + 5C) \cos \theta + (-D - 4C + 5D) \sin \theta = 6 \sin \theta$$

$$4C + 4D = 0 \quad 4C = -4D \quad C = -D$$

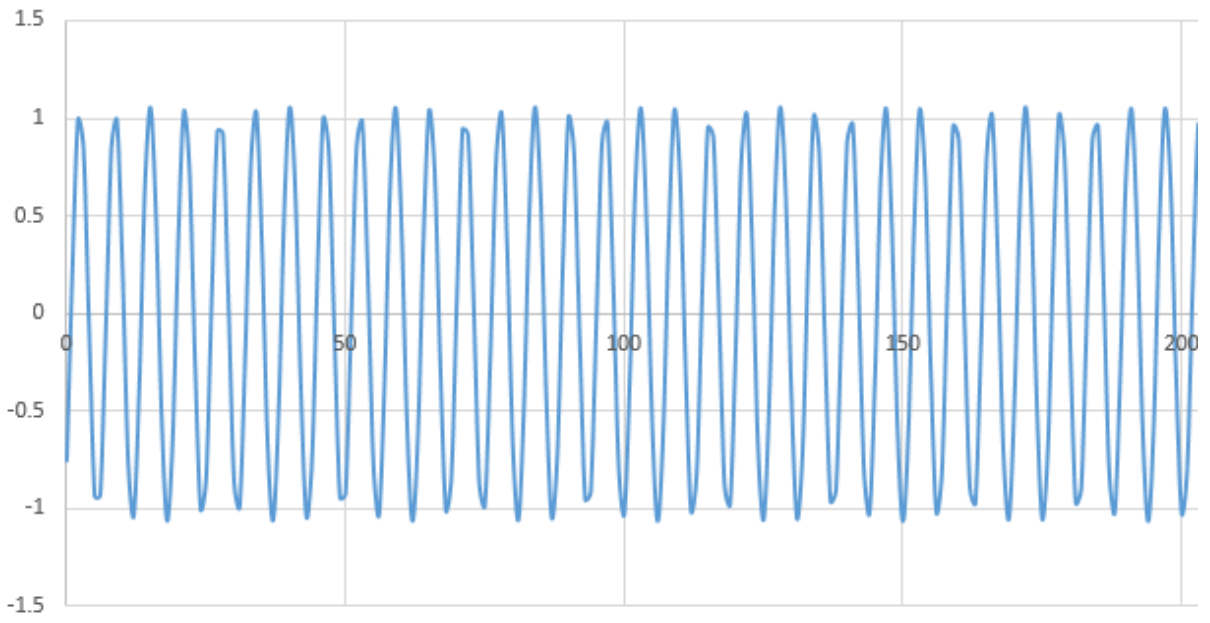
$$C = -D \quad 4D - 4(-D) = 6$$

$$4D + 4D = 6$$

$$8D = 6$$

$$D = \frac{6}{8}$$

$$D = \frac{3}{4}$$



EJERCICIO COMPLETO mae

15/10/2019

COMPUTER INTEGRATION

ENG 331

Assignment 2

$$1. \frac{dy}{dt} + 4y + 5y = 6 \cos \theta$$

$$m^2 + 4m + 5 = 0$$

$$-b \pm \sqrt{b^2 - 4ac}$$

$$\frac{-4 \pm \sqrt{4^2 - 4(1)(5)}}{2(1)}$$

$$= \frac{-4 \pm \sqrt{16 - 20}}{2}$$

$$= \frac{-4 \pm \sqrt{-4}}{2}$$

$$= \frac{-4 \pm 2j}{2}$$

$$= -2 \pm j$$

C.F.:

$$y = e^{-2\theta} (C \cos \theta + D \sin \theta)$$

P.I.

$$y = C \cos kx + D \sin kx$$

$$y = C \cos \theta + D \sin \theta$$

$$\frac{dy}{d\theta} = -C \sin \theta + D \cos \theta$$

$$(-C \cos \theta - D \sin \theta) + 4(-C \sin \theta + D \cos \theta) + 5(C \cos \theta + D \sin \theta) = 6 \sin \theta$$

$$-C \cos \theta - D \sin \theta - 4C \sin \theta + 4D \cos \theta + 5C \cos \theta + 5D \sin \theta = 6 \sin \theta$$

$$(-C + 4D + 5C) \cos \theta + (-D - 4C + 5D) \sin \theta = 6 \sin \theta$$

$$4C + 4D = 0 \quad 4C = -4D \quad C = -D$$

$$4C + 4D = 0 \quad 4D - 4C = 6$$

$$C = -D \quad 4D - 4(-D) = 6$$

$$4D + 4D = 6$$

$$8D = 6$$

$$D = \frac{3}{4}$$

$$D = \frac{3}{4}$$

$$D = \frac{3}{4}$$

$$4c + 40 = 0$$

$$4c + 4\left(\frac{3}{4}\right) = 0$$

$$4c + 3 = 0$$

$$4c = -3$$

$$c = -\frac{3}{4}$$

$$P.I = y = -\frac{3}{4} \cos \theta + \frac{3}{4} \sin \theta$$

General Solution

$$y = e^{-2\theta} (C \cos \theta + D \sin \theta) - \frac{3}{4} \cos \theta + \frac{3}{4} \sin \theta$$

iii at $\theta = \infty$ and $\frac{dx}{dt} = 0$ OR $\frac{dy}{d\theta} = 0$

$$\frac{dy}{d\theta} = (e^{-2\theta}) (-C \sin \theta + D \cos \theta) + (C \cos \theta + D \sin \theta) (-2e^{-2\theta}) + \frac{3}{4} \sin \theta + \frac{3}{4} \cos \theta$$

$$\frac{dy}{d\theta} = (e^{-2\theta}) (D \cos \theta - C \sin \theta) - 2e^{-2\theta} (C \cos \theta + D \sin \theta) + \frac{3}{4} \sin \theta + \frac{3}{4} \cos \theta$$

$$\text{at } \theta = 0$$

$$0 = \frac{3}{4} \sin \theta + \frac{3}{4} \cos \theta$$

$$-\frac{3}{4} \sin \theta = \frac{3}{4} \cos \theta$$

$$-\sin \theta = \cos \theta$$

$$-\frac{\sin \theta}{\cos \theta} = 1$$

$$\cos \theta$$

$$-\tan \theta = 1$$

$$\tan \theta = -1$$

$$\theta = \tan^{-1}(-1)$$

$$\theta = \underline{\underline{-45^\circ}}$$

$$2EI \frac{d^4 y}{dx^4} = \frac{w}{2} (L-x)^2$$

$$EI m^4 = 0$$

$$m^4 = 0$$

$$m = 0$$

$$y = e^{0x} (A+Bx)$$

$$y = A+Bx$$

PI

$$y = Fx^2 + Gx^3 + Hx^4$$

$$\frac{dy}{dx} = 2Fx + 3Gx^2 + 4Hx^3$$

dx

$$\frac{d^2 y}{dx^2} = 2F + 6Gx + 12Hx^2$$

dx²

$$EI [2F + 6Gx + 12Hx^2] = \frac{w}{2} (L-x)^2$$

$$2FEI + 6GEIx + 12HEIx^2 = \frac{w}{2} (L-x)^2$$

$$4FEI + 12GEIx + 24HEIx^2 = w(L^2 - 2Lx + x^2)$$

$$4FEI + 12GEIx + 24HEIx^2 = wL^2 - 2wLx + wx^2$$

$$24HEI = w$$

$$H = \frac{w}{24EI}$$

$$12GEI = -2wL$$

$$G = \frac{-2wL}{12EI} = \frac{-wL}{6EI}$$

$$4FEI = wL^2$$

$$F = \frac{wL^2}{4EI}$$

$$y = \left(\frac{wL^2}{4EI}\right)x^2 - \left(\frac{wL}{6EI}\right)x^3 + \left(\frac{w}{24EI}\right)x^4$$

$$y = \frac{6wL^2 x^2 - 4wLx^3 + wx^4}{24EI}$$

$$P.I. \Rightarrow y = \frac{w}{24EI} [6L^2 x^2 - 4Lx^3 + x^4]$$

General Solution

$$y = A + Bx + \frac{w}{24EI} [6L^2x^2 - 4wx^3 + x^4]$$

at $y=0$, and $\frac{dy}{dx} = 0$ at $x=0$

$$0 = A$$

$$\frac{dy}{dx} = B + \frac{w}{24EI} [12L^2x - 12x^3 + 4x^3]$$

$$0 = B$$

Particular solution

$$y = \frac{w}{24EI} [6L^2x^2 - 4Lx^3 + x^4]$$

$$y = \frac{wx^2}{24EI} [6L^2 - 4Lx + x^2]$$

when $x=L$

$$y = \frac{wL^2}{24EI} [6L^2 - 4L^2 + L^2]$$

$$y = \frac{wL^4}{24EI} [3]$$

$$y = \frac{wL^4}{8EI}$$