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MAT NO: 18/ENG04/005

ELECTRICAL/ELECTRONICS ENGINEERING

ENGINEERING MATHEMATICS ASSIGNMENT

ADETORO MAYORIN SOLA  
18/2/2014/005

ELECTRICAL / ELECTRONICS ENGINEERING.

$$\frac{dm}{dt} = \dot{m}_{in} - \dot{m}_{out} \quad (1)$$

$$\dot{m}_{in} = 50(1 + \sin t)$$

$$\dot{m}_{out} = 30 \times \left( \frac{m}{120 + 2t} \right)$$

$$\frac{dm}{dt} = 50(1 + \sin t) - \frac{3m}{120 + 2t}$$

$$\frac{dm}{dt} + \frac{3m}{120 + 2t} = 50(1 + \sin t)$$

using I.F

$$\frac{dy}{dx} + Py = Q$$

$$P = \frac{3}{120 + 2t}, \quad Q = 50(1 + \sin t)$$

$$\int P dx = 3 \ln(120 + 2t)$$

$$I.F = e^{\int P dx} = e^{3 \ln(120 + 2t)} = (120 + 2t)^3$$

$$I.F = (120 + 2t)^3$$

$$y \cdot I.F = \int Q \cdot I.F dx$$

$$m(120 + 2t)^3 = 50 \int (120 + 2t)^3 (1 + \sin t)$$

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18/E2604/005

ELECT/ELECT

$$m(120 + 2t)^3 =$$

$$2t^4 + 480t^3 + 43200t^2 + 172800t - \cos t (120 + 2t)^3 + 6\sin t (120 + 2t)^2 + C$$

$$m = \frac{(2t^4 + 480t^3 + 43200t^2 + 172800t)}{(120 + 2t)^3} - \cos t + \frac{6\sin t}{(120 + 2t)} + \frac{C}{(120 + 2t)^3}$$

at  $t = 0$

$$m = 150$$

$$150 = 50 \left( -1 + \frac{C}{120^3} \right)$$

$$150 = -50 + \frac{50C}{120^3}$$

$$C = 518399$$

$$m = \frac{(2t^4 + 480t^3 + 43200t^2 + 172800t)}{(120 + 2t)^3} - \cos t + \frac{6\sin t}{(120 + 2t)}$$

$$+ \frac{518399}{(120 + 2t)^3}$$





