Add eqn ① and ②.

$$8C = -6$$

$$C = -\frac{6}{8}\ 4$$

$$C = -3/4$$

from eqn ①

$$4D + 4C = 0$$

$$4D + 4(-3/4) = 0$$

$$4D + (-3) = 0$$

$$4D = 3$$

$$D = 3/4$$

P.I, $y = -3/4 \cos\theta + 3/4 \sin\theta$

$$y = 3/4(-\cos\theta + \sin\theta).$$

G.S = C.F + P.I

$$y = e^{-2\theta}(A\cos\theta + B\sin\theta) + 3/4(\cos\theta + \sin\theta).$$

(ii) Neglecting the C.F.

$$y = 0.75(-\cos\theta + \sin\theta)$$

$$y = 0.75[\cos\theta - \sin\theta]$$

From θ to 270°.

iii) Steady state value;

$$\frac{dy}{d\theta} = 0 \qquad \theta = \infty$$

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

$$\frac{d^2y}{d\theta^2} + \frac{4dy}{d\theta} + 5y = 0$$

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

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

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

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

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

$$\frac{-4 + j2}{2}$$

$$-2 \pm j$$

C.F

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

P. I

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

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

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

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

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

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

Comparing Co-efficients

$$-C + 4D + 5C = 0$$

$$D - 4C + 5D = 6$$

$$4D + 4C = 0 \quad \text{— (i)}$$

$$-4C + 4D = 6 \quad \text{— (ii)}$$