(37)

$$y_p = A\cos 2t + B\sin 2t$$
$$y_p' = -2A\sin 2t + 2B\cos 2t$$
$$y_p'' = -4A\cos 2t - 4B\sin 2t$$
$$y_p'' + 2y_p' + 2y_p = \cos 2t(-4A + 4B + 2A) + \sin 2t(-4B - 4A + 2B)$$
$$= (-2A + 4B)\cos 2t + (-2B - 4A)\sin 2t$$

$$-2A + 4B = 10$$
$$-2B - 4A = 0 \qquad -2A = B$$
$$5B = 10$$
$$B = 2$$
$$-2A = 2, \quad A = -1.$$

Steady soln: $y_s = -\cos 2t + 2\sin 2t$

Method 2 $\quad y_p(t) = \dfrac{F_0}{\sqrt{(k - m\gamma)^2 + b^2\gamma^2}} \sin(\gamma t + \theta)$

$m = 1, \ \gamma = 2, \ k = 2, \ b = 2, \ F_0 = 10$

$(k - m\gamma^2)^2 + b^2\gamma^2 = (2 - 2^2)^2 + 2^2 \cdot 2^2 = 2^2 + 2^2 \cdot 2^2 = 20$

$\sqrt{(\ )^2 + b^2\gamma^2} = \sqrt{20} = 2\sqrt{5} \qquad = 4 + 16 = 20$

$$\tan\theta = \frac{k - m\gamma^2}{b\gamma} = \frac{-2}{4} = \frac{-1}{2}$$

θ corresp to pt in the 4^{th} quadrant $(+, -)$

$\theta = \tan^{-1}(-1/2) = -\tan^{-1}(1/2) \approx -0.464.$

Steady soln

$$y_p = \frac{10}{2\sqrt{5}} \sin(2t + \theta) = \sqrt{5}\sin(2t - \tan^{-1}(\tfrac{1}{2}))$$

$$\approx (2.236)\sin(2t - 0.464).$$