

(۱)

$$x^2 - \omega x + \gamma = 0$$

$$\frac{\epsilon \alpha + \beta^2}{\omega \beta^2}$$

$$x^2(\alpha + \beta) + \alpha\beta = 0$$

$$\alpha + \beta = \omega$$

$$\alpha\beta = \gamma$$

$$\beta^2 - \omega\beta + \gamma = 0 \rightarrow \beta^2 = \omega\beta - \gamma$$

$$\rightarrow \beta^3 - \beta \times \beta^2 = \beta(\omega\beta - \gamma) = \omega\beta^2 - \gamma\beta$$

$$\omega(\omega\beta - \gamma) - \gamma\beta = \omega^2\beta - \omega\gamma - \gamma\beta = \omega^2\beta - \gamma\beta - \omega\gamma$$

$$\beta^4 - \beta \times \beta^3 = \beta(\omega^2\beta - \gamma\beta - \omega\gamma)$$

$$10\omega\beta - \epsilon\gamma, \beta^5 = \beta \times \beta^4 = \beta(10\omega\beta - \epsilon\gamma) = 10\omega\beta^2 - \epsilon\gamma\beta = 10\omega(\omega\beta - \gamma) - \epsilon\gamma\beta = \omega^2\omega\beta$$

$$-10\gamma - \epsilon\gamma\beta = \epsilon\gamma\omega\beta - \gamma$$

$$\epsilon\alpha + \beta^2 = \gamma \rightarrow \epsilon(\omega - \beta) = \gamma - \epsilon\beta \rightarrow \epsilon\alpha + \beta^2 = \gamma - \epsilon\beta + \epsilon\gamma\omega\beta - \gamma = -19\gamma + \epsilon\gamma\omega\beta$$

$$\omega\beta^2 = \omega(\omega\beta - \gamma) = \omega^2\omega\beta - \omega\gamma$$

$$\Rightarrow \frac{\epsilon\gamma\omega\beta - 19\gamma}{\omega^2\omega\beta - \omega\gamma} = \frac{\omega(9\omega\beta - 31\gamma)}{\omega^2(\omega\beta - \gamma)} \Rightarrow \frac{9\omega\beta}{\omega\beta} = 19$$

$$19\omega(\omega\beta - \gamma) = 9\omega\beta - 31\gamma$$

$$\frac{9\omega\beta - 31\gamma}{\omega\beta - \gamma} = 19 \rightarrow \text{جواب}$$

(۲)

$$1) 9a + 3b + c = -5$$

$$2) \frac{1}{2}a - \frac{1}{3}b + c = -4$$

از (۱) و (۲)

$$a(1 - \frac{1}{2a}) + b(3 + \frac{1}{3}) = 0 \Rightarrow \frac{22}{3}a + \frac{10}{3}b = 0$$

$$\xrightarrow{\times 3} 22a + 10b = 0 \xrightarrow{\div 2} 11a + 5b = 0 \Rightarrow b = -\frac{11}{5}a$$

$$-\frac{b}{a} = -\frac{-\frac{11}{5}a}{a} = \frac{11}{5} = 2.2 \leftarrow \text{نسبت منهای تانج = نسبت های معادله درجه ۲}$$

(۳)

$$\alpha + \beta = -2k, \alpha\beta = \omega$$

$$|\alpha - \beta| = \sqrt{(\alpha + \beta)^2 - 4\alpha\beta} = \sqrt{(-2k)^2 - 4\omega} = \sqrt{4k^2 - 4\omega} = 2\sqrt{k^2 - \omega}$$

$$2\sqrt{k^2 - \omega} = \frac{4}{3}k \xrightarrow{\div 2} \sqrt{k^2 - \omega} = \frac{2}{3}k \xrightarrow{\text{مربع کردن}} k^2 - \omega = \frac{4}{9}k^2 \rightarrow k^2 - \frac{4}{9}k^2 = \omega$$

$$\frac{5}{9}k^2 = \omega \rightarrow k^2 = \frac{9}{5}\omega \rightarrow k = \sqrt{\frac{9}{5}\omega} = \frac{3}{\sqrt{5}}\sqrt{\omega} \Rightarrow \left[\frac{3}{\sqrt{5}}\right] = \left[\frac{1}{\sqrt{5}}\right] = \left[\frac{\epsilon}{\omega}\right] = \frac{\epsilon}{\omega}$$

جواب

$$y = a(x-h)^2 + k \rightarrow y = k \Rightarrow \boxed{k=1} \rightsquigarrow y = a(x-h)^2 + 1$$

بقی سوال

A. (3, y) $\Rightarrow$ دارای عرض
B. (-4, y) $\Rightarrow$ مشترک هستند

$$\rightarrow a(3-h)^2 + 1 = a(-4-h)^2 + 1 \rightarrow (3-h)^2 \cdot (-4-h)^2$$

$$9 - 4h + h^2 = 16 + 10h + h^2 \Rightarrow -14 = 14h \Rightarrow \boxed{h=-1}$$

نقطه C، رأس است (-1, 1)

$$y=0 \rightarrow 0 = a(x+1)^2 + 1 \Rightarrow a(x+1)^2 = -1 \xrightarrow[\text{نقطه بر محور x}]{\text{نقطه بر محور x}} x = -1 \pm \sqrt{\frac{-1}{a}} \begin{cases} \alpha = -1 - \sqrt{\frac{-1}{a}} \\ \beta = -1 + \sqrt{\frac{-1}{a}} \end{cases}$$

$$\alpha^2 + \beta^2 = 20 \Rightarrow (-1-s)^2 + (-1+s)^2 = 20 \rightarrow s = \sqrt{\frac{-1}{a}} \rightarrow (1+2s+s^2) + (1-2s+s^2) = 20$$

$$2 + 2s^2 = 20 \rightarrow s^2 = \frac{18}{2} \Rightarrow -\frac{1}{a} = \frac{18}{2} \Rightarrow a = -\frac{2}{18} \Rightarrow a = -\frac{1}{9} \Rightarrow h=0 \quad y = a(0+1)^2 + 1 = -\frac{1}{9} + 1 = \frac{8}{9}$$

نقطه D، نقطه تقاطع محور x

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-\omega \pm \sqrt{4\omega + 4m}}{-2} \begin{cases} x_1 = \frac{\omega + \sqrt{4\omega + 4m}}{2} \\ x_2 = \frac{\omega - \sqrt{4\omega + 4m}}{2} \end{cases}$$

$$a(0) \Rightarrow x_1 \rightarrow \frac{\omega + \sqrt{4\omega + 4m}}{2} < \frac{1}{4} \Rightarrow \sqrt{4\omega + 4m} < \frac{1}{2} \Rightarrow 4\omega + 4m < \frac{1}{4} \Rightarrow m < -\frac{1}{4} - \omega$$

$$m(-\frac{1}{4} - \omega) = -2, 20 \quad \Delta > 0 \Rightarrow 4\omega + 4m > 0 \Rightarrow m > -\omega$$

محدوده مجاز $m \Rightarrow -4, -5, -6, -7, -8, -9, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -20$ مقادیر صحیح می باشد.

④ نزدیک مقدار یعنی $a > 0$ ، $x_{min} = \frac{14}{2m} = \frac{7}{m} \Rightarrow \min$

$$y_{min} = m\left(\frac{7}{m}\right)^2 - 12\left(\frac{7}{m}\right) + \omega m - 1 \Rightarrow y_{min} = m \times \frac{49}{m^2} - \frac{84}{m} + \omega m - 1 = \frac{49}{m} + \omega m - 1$$

$$-\frac{84}{m} + \omega m - 1 = 2 \rightarrow \omega m^2 - 3m - 84 = 0, \Delta = 9 + 4 \times 84 = 337 \Rightarrow m_2 = \frac{3 \pm \sqrt{337}}{2} \begin{cases} m_1 = 23 \\ m_2 = -\frac{12}{\omega} \end{cases}$$

$$\Rightarrow x = \frac{7}{m} \rightarrow \text{مقدار} \rightarrow \boxed{x=2} \quad \text{اگر } m=3 \rightarrow \text{مقدار} \rightarrow \boxed{x=2}$$

$$\rightarrow \text{اگر } m = -\frac{12}{\omega} \rightarrow \text{مقدار} \rightarrow \boxed{x = -2, \omega}$$

⑤ رتبه مرگ در یک هفت روز، از معادله ی جیبی به دست می آید. با توجه به اینکه $a = -\frac{1}{4}$ معادله ی $\frac{\alpha}{a} = \frac{\beta}{a} \Rightarrow \alpha' = a\beta \rightarrow \alpha + \beta = -2(\alpha + 1), \alpha\beta = 2\alpha - 1, \beta = \frac{\alpha'}{a}$

$$\xrightarrow{\text{جایگزینی}} \alpha + \frac{\alpha'}{a} = -2(\alpha + 1) \xrightarrow{\times a} \alpha a + \alpha' = -2a(\alpha + 1) \Rightarrow \alpha^2 + \alpha a + 2a(\alpha + 1) = 0$$

$$\alpha \times \frac{\alpha'}{a} = 2\alpha - 1 \Rightarrow \frac{\alpha^2}{a} = 2\alpha - 1, \alpha' = a\beta \Rightarrow \alpha\beta = 2\alpha - 1 \Rightarrow \beta = \frac{\alpha'}{a}$$

$$\alpha + \frac{\alpha'}{a} = -2(\alpha + 1) \Rightarrow \alpha^2 + \alpha a + 2a(\alpha + 1) = 0 \Rightarrow \alpha^2 = -\alpha a - 2a(\alpha + 1) \Rightarrow \alpha^2 = a(2\alpha - 1) \Rightarrow \alpha a^2 = a(2\alpha - 1) \Rightarrow a(-\alpha a - 2a(\alpha + 1)) = a(2\alpha - 1) \Rightarrow -\alpha a^2 - 2a^2(\alpha + 1) = a(2\alpha - 1) \Rightarrow -\alpha a^2 - 2a^2\alpha - 2a^2 = 2a\alpha - a \Rightarrow -\alpha a^2 - 2a^2\alpha - 2a^2 - 2a\alpha + a = 0$$

$$\lambda^2 - v\lambda - \omega = 0 \rightarrow \lambda^2 = t \rightarrow t^2 - vt - \omega = 0 \quad \begin{matrix} s = v \\ p = -\omega \end{matrix}$$

(1)

$$\Delta = b^2 - 4ac \Rightarrow (v)^2 - 4(-\omega) = v^2 + 4\omega$$

$$\lambda = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-v \pm \sqrt{v^2 + 4\omega}}{2}$$

$$c = -\omega, b = -v, a = 1 \quad (9)$$

$$\lambda = \frac{v}{2k} = \frac{v}{k} ; y_1 = k\left(\frac{v}{k}\right)^2 - v\left(\frac{v}{k}\right) - \omega = -\frac{v}{k} - \omega \Rightarrow -\frac{v}{k} - \omega = -v\left(\frac{v}{k}\right) - \omega$$

$$-\frac{v}{k} - \omega = -\frac{v}{k} - \omega \Rightarrow \frac{(-v + \omega)}{k} = 0 \rightarrow -v + \omega = 0 \rightarrow \omega = v \Rightarrow \boxed{k = 2} \Rightarrow \text{معدل التغير} = 1$$

$$-m\lambda^2 + m\lambda + 1 = -m - \lambda \quad \text{معدل التغير} \quad -m\lambda^2 + m\lambda + 1 + m + \lambda = 0 \Rightarrow -m\lambda^2 + (m+1)\lambda + (1+m) = 0$$

(10)

$$\begin{aligned} \frac{x-1}{x} m\lambda^2 - (m+1)\lambda - (1+m) &= 0 \quad \Delta = (-m-1)^2 - 4(-m)(-m-1) = (m+1)^2 + 4m \\ x(m+1) &= (m+1)((m+1) + 4m) \Rightarrow (m+1)(5m+1) \Rightarrow (m+1)(5m+1) = 0 \quad \begin{matrix} m = -1 \\ m = -\frac{1}{5} \end{matrix} \\ m = -1 &\Rightarrow -1(m - \frac{1}{5}) \Rightarrow \text{معدل التغير} \end{aligned}$$