

$$x^2 - \omega x + 1 = 0 \Rightarrow S = \alpha + \beta = -\omega \text{ و } P = \alpha\beta = 1$$

$$x = \beta \Rightarrow \alpha = \frac{1}{\beta} \Rightarrow \frac{\alpha + \beta}{\omega\beta^2} = \frac{1 \times \frac{1}{\beta} + \beta}{\omega\beta^2} = \frac{1 + \beta^2}{\omega\beta^2}$$

$$\beta^2 = \omega\beta - 1$$

$$\beta^2 = 22\beta - 1$$

$$\beta^2 = 21\omega\beta - 9\omega^2$$

$$\Rightarrow \frac{1 + \beta^2}{\omega\beta^2} = \frac{21\omega\beta - 9\omega^2}{\omega\beta^2} \Rightarrow \frac{1 + \beta^2}{\omega\beta^2} = \frac{21\omega\beta - 9\omega^2}{\omega\beta^2} \Rightarrow 19(11\omega\beta - 9\omega^2) = 11\omega\beta - \omega^2$$

$$\Rightarrow 11\omega\beta - \omega^2 = 19(11\omega\beta - 9\omega^2)$$

هر دو نقطه عرض یکسان دارند پس محور تقارن برابر میانگین ریشه‌ها می‌باشد.

$$x = \frac{3 + (-1,5)}{2} = \frac{1,5}{2} = 0,75$$

$$\frac{\alpha + \beta}{2}$$

$$\alpha + \beta = \frac{\alpha + \beta}{2} = 0,75 \Rightarrow \alpha + \beta = 1,5$$

$$x^2 + 2kx + a = 0 \quad |\alpha - \beta| = \sqrt{b^2 - 4ac} \Rightarrow a = 1, b = 2k, c = a$$

$$|\alpha - \beta| = \sqrt{(2k)^2 - 4(1)(a)} = \sqrt{4k^2 - 4a} = 2\sqrt{k^2 - a}$$

$$|\alpha - \beta| = \frac{2}{k} \Rightarrow 2\sqrt{k^2 - a} = \frac{2}{k} \Rightarrow \sqrt{k^2 - a} = \frac{1}{k} \Rightarrow k^2 - a = \frac{1}{k^2} \Rightarrow k^2 - \frac{1}{k^2} = a \Rightarrow \frac{k^4 - 1}{k^2} = a$$

$$\left[\frac{k^2}{1} \right] = \frac{1}{k^2} = 1$$

$$x = \frac{3 + (-5)}{2} = -1 \Rightarrow (-1, 1)$$

$$y = a(x+1)^2 + 1$$

$$a = a(x+1)^2 + 1 \Rightarrow a(x+1)^2 = 0 \Rightarrow (x+1)^2 = 0 \Rightarrow x = -1$$

$$S = \alpha + \beta = -5 \text{ و } P = \alpha\beta = 1 + \frac{1}{2} = \frac{3}{2} \Rightarrow \frac{1}{\alpha} = -\frac{5}{2} \Rightarrow \alpha = -\frac{2}{5}$$

$$\alpha^2 + \beta^2 = 5 \Rightarrow \alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta \Rightarrow 5 = 25 - 2\alpha\beta \Rightarrow \alpha\beta = \frac{10}{2} = 5$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Rightarrow \frac{-a \pm \sqrt{2a + 4m}}{2a} < \frac{a}{2} \Rightarrow \pm \sqrt{2a + 4m} < \frac{3a}{2}$$

$$\Rightarrow 0 \leq 2a + 4m < 14 \Rightarrow -4,25 \leq m < -2,25 \Rightarrow m \in [-4,25, -2,25)$$

$$y = m x^r - (r x + \omega m - 1) \quad m = \frac{-b}{r a} \Rightarrow b = -1 \quad a = m \Rightarrow m = -\frac{-1r}{r m} = \frac{1r}{r m} = \frac{1}{m}$$

$$y_{min} = a \left(\frac{-b}{r a} \right)^r + b \left(\frac{-b}{r a} \right) + c \Rightarrow y_{min} = m \left(\frac{1}{m} \right)^r - 1r \times \frac{1}{m} (\omega m - 1)$$

$$y_{min} = \frac{-1r}{m} + \omega m - 1 \Rightarrow \frac{-1r}{m} + \omega m - 1 = r \Rightarrow -1r + \omega m^r = r m$$

$$m = r \Rightarrow \omega = 1 \quad \checkmark (\min) \quad \checkmark$$

$$m = \frac{-1r}{\omega} \Rightarrow \omega = -\frac{1}{r} \quad \checkmark$$

$$\omega m^r - r m - 1r = 0 \quad \left\{ \begin{array}{l} m = r \\ m = -\frac{1}{\omega} \end{array} \right.$$

$$x^r + r(a+1)x + r a - 1 = 0$$

$$x + B = -r(a+1) \Rightarrow r a - 1$$

$$\frac{a}{x} = \frac{B}{a} \Rightarrow a^r = x B$$

$$x^r = x B = r a - 1 \Rightarrow x^r - r a + 1 = 0 \Rightarrow (a-1)^r = 0 \Rightarrow a = 1$$

$$x^r - r(1+1)x + (r \times 1 - 1) = x^r + r x + 1 = 0 \Rightarrow x = -r \pm \sqrt{r} \Rightarrow x = -r \pm \sqrt{r} \Rightarrow B$$

$$\checkmark (\checkmark) \quad \checkmark (\checkmark) \quad \checkmark (\checkmark)$$

$$x^r - v x^r - \omega = 0 \Rightarrow x^r = t \Rightarrow x^r - v t - \omega = 0 \Rightarrow \Delta = r a - r (\omega) = 49$$

$$t = \frac{v \pm \sqrt{49}}{r} \Rightarrow t_1 = \frac{v + \sqrt{49}}{r} \quad t_2 = \frac{v - \sqrt{49}}{r}$$

$$S = 0 \Rightarrow r S p = 0 \Rightarrow r S = 0$$

$$x^r = \frac{v + \sqrt{49}}{r} \Rightarrow x_{1,2} = \pm \sqrt{\frac{v \pm \sqrt{49}}{r}} \Rightarrow p = \frac{v + \sqrt{49}}{r}$$

$$r p^r = r \left(\frac{v + \sqrt{49}}{r} \right)^r = \frac{11 \pm \sqrt{49}}{r}$$

$$y = k x^r - f x - 4 \quad y = -f x - f \quad x = \frac{-b}{r a} \Rightarrow b = -r \quad a = k$$

$$x_{min} = \frac{-(f)}{r} = \frac{r}{k} = \frac{r}{k}$$

$$y_{min} = k \left(\frac{r}{k} \right)^r - f \left(\frac{r}{k} \right) - 4 \Rightarrow y_{min} = \frac{-f}{k} - 4$$

$$y_{min} = -f \left(\frac{r}{k} \right) - f \Rightarrow y_{min} = \frac{-1}{k} - f = -1$$

$$y_{min} = -1 \quad \checkmark$$

$$\checkmark (\checkmark) \quad \checkmark (\checkmark)$$

$$-m x^r + m x + 1 = -m - x \Rightarrow -m x^r + m x + 1 + m + x = 0$$

$$m x^r - (m+1)x - (m+1) = 0 \Rightarrow -m x^r + (m+1)x + (1+m) = 0$$

$$\Delta = (- (m+1))^2 - 4 \times m \times (- (m+1))$$

$$(m+1)^2 - 4 m (- (m+1)) = (m+1)^2 + 4 m (m+1)$$

$$(m+1)(m+1+4m) < 0 \Rightarrow m = -\frac{1}{\omega}$$

$$m = -1 \Rightarrow m < -\frac{1}{\omega} \Rightarrow m \in (-1, -\frac{1}{\omega})$$

$$r = 1$$