

۱۸، ۷۵

$P_{f(a)} = [-r, r]$

$f\left(\frac{r\alpha + r}{\omega}\right) \rightarrow D_{f\left(\frac{r\alpha + r}{\omega}\right)} = [-r, r]$

$-r \leq \frac{r\alpha + r}{\omega} \leq r$

$-1 \leq r\alpha + r \leq r$

$-1 \leq r\alpha \leq 1$

$-r \leq \alpha \leq r$

$f(r\alpha - r) \rightarrow D = [-r, r]$

$r\left(\frac{r}{r}\right) - r = r$
 $r\left(\frac{-r}{r}\right) - r = -r$

$f(r) \rightarrow D = ? \rightarrow D = [-1, r]$

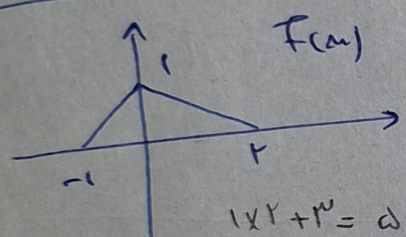
$f\left(\frac{r\alpha + 1}{r}\right) \rightarrow D = [-1, r]$

$\frac{r\left(\frac{r}{r}\right) + 1}{r} = \frac{-r}{r} = -1$

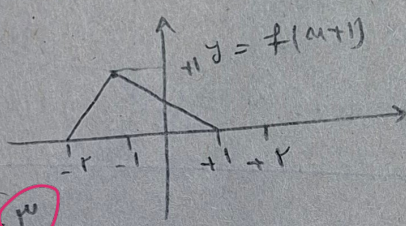
$\frac{r\left(\frac{r}{r}\right) + 1}{r} = \omega$

$f(r - \omega\alpha) \rightarrow D = \left(-\frac{r}{\omega}, \frac{r}{\omega}\right]$

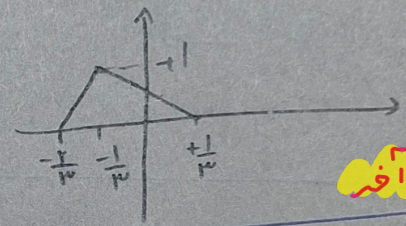
$-1 \leq r - \omega\alpha \leq \omega \xrightarrow{-r} -r \leq -\omega\alpha < r \xrightarrow{\times (-1)} r > \omega\alpha > -r \xrightarrow{\frac{r}{\omega}} \alpha > -\frac{r}{\omega}$



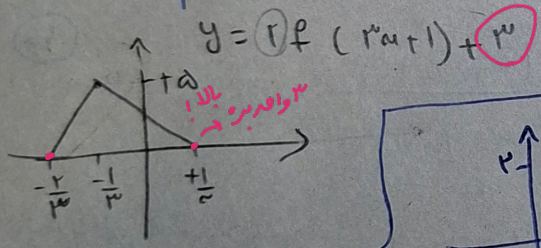
$y = r f(r\alpha + 1) + r$



$y = f(r\alpha + 1)$

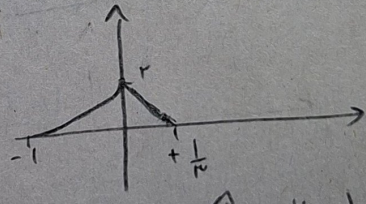
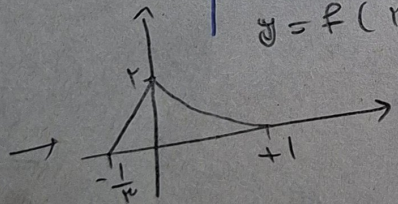
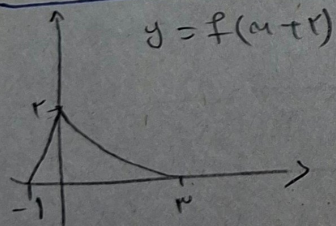
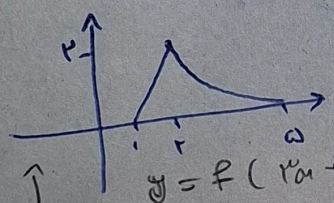


صحنه آخر



$y = \frac{1}{r} f(r - r\alpha)$

$y = f(-r\alpha + r)$

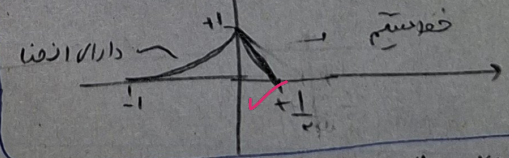


$y = \frac{1}{r} f(-r\alpha + r)$

$y = -\frac{1}{r\omega} \alpha^2 + \frac{r}{\omega} \alpha + 1$

$y = -\frac{1}{r\omega} \left(\alpha - \frac{r}{\omega}\right)^2 + 1$

خود را حاصل کرده و با کمک طول قطع کرده



$r_0 = \frac{r}{\omega} \quad y_0 = \frac{r}{r\omega}$

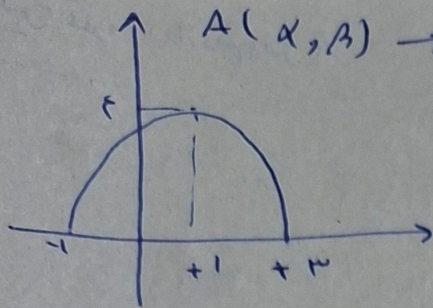
$y = -\frac{1}{r\omega} \left(\alpha - \frac{r}{\omega}\right)^2 + 1 = -\frac{1}{r\omega} \left[\left(\alpha - \frac{r}{\omega}\right)^2 - \frac{r}{\omega}\right] + 1 = -\frac{1}{r\omega} \left(\alpha - \frac{r}{\omega}\right)^2 + \frac{r}{r\omega}$

$\frac{r}{r\omega} - \frac{r}{\omega} = \frac{1}{\omega} \quad \frac{r}{r\omega} - \frac{r}{r\omega} = \frac{r}{r\omega}$

$y = -\frac{1}{r\omega} (\alpha - r)^2 + r \quad y = 0$

$\frac{1}{r\omega} (\alpha - r)^2 = r \rightarrow (\alpha - r)^2 = r$

$\alpha - r = \pm r$
 $\alpha = +r$
 $\alpha = +1$



$$A(\alpha, \beta) \rightarrow y = 1 - r f(r\alpha + r) \quad \alpha\beta = ?$$

$$r\alpha + r = 1 \rightarrow \alpha = \frac{1-r}{r}$$

$$\alpha\beta = -\frac{1}{r} \cdot 1 - r = \frac{1}{r}$$

$$y = 1 - r f\left(\frac{1-r}{r} + r\right) = 1 - 1 = -r \rightarrow \beta = -r$$

(1) (2)

$$D_f = (a, c)$$

$$D_g = [-1, b)$$

$$y = f(u-1) + g(u+1) \quad (1) (2)$$

$$a < u-1 \leq c$$

$$-1 \leq u+1 < b$$

$$(a+1, c] \cap [-r, b-1) = (-r, c)$$

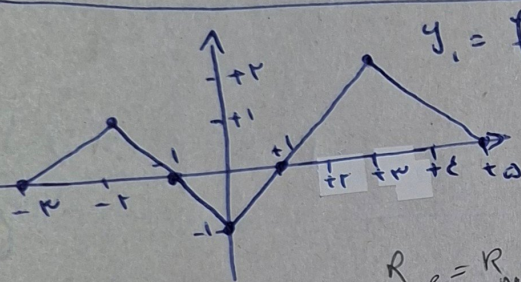
$$a+1 < u \leq c$$

$$-r \leq u < b-1$$

$$a+1 = -r \rightarrow a = -r-1$$

$$b-1 = c \rightarrow b = c+1$$

$$a-b = -r-1-(c+1) = -r-c-2$$



$$y_1 = f\left(\frac{u}{r} + 1\right)$$

$$y_r = \sqrt{1 - r f(u) - r}$$

$$R_{y_r} = ?$$

$$D_{y_r} = ?$$

$$R_{f(u)} = R_{f\left(\frac{u}{r} + 1\right)}$$

$$r f(u) - r > 0 \rightarrow \text{حدود برای u}$$

$$D_{y_r} = [-r, c]$$

$$R_{y_r} = [0, c]$$

$$-1 \leq f(u) \leq r \rightarrow -c \leq r f(u) - r \leq 1$$

$$0 \leq |r f(u) - r| \leq c \rightarrow 0 \leq \sqrt{|r f(u) - r|} \leq \sqrt{c}$$

صغری آفر

$$f(u) = \left| \frac{u+1}{r u + 1} \right|$$

$$g(u) = \left| \frac{u-1}{r(u-r)+1} \right| + 1$$

$$u + g(u) < 0 \rightarrow u + \left| \frac{u-1}{r u - r} \right| + 1 < 0$$

$$u < -1 \rightarrow \text{بسیار قدر مطلق را مثبت می‌کنیم}$$

$$u+1 + \frac{u-1}{r u - r} < 0$$

$$\rightarrow \frac{(u+1)(r u - r) + (u-1)}{r u - r} < 0 \rightarrow \frac{r(u^2 - 2)}{r u - r} < 0$$

$$u < -1 \rightarrow \text{خرج منفی}$$

$$u^2 - 2 > 0 \rightarrow u^2 > 2 \rightarrow \begin{cases} u > \sqrt{2} \\ u < -\sqrt{2} \end{cases}$$

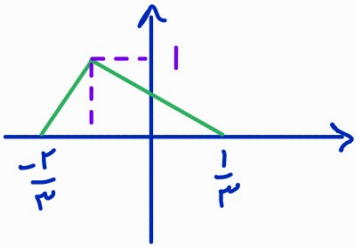
$$\Rightarrow (-\infty, -\sqrt{2})$$

$$D_{y_1} = [-r, \Delta] \rightarrow -r \leq x \leq \Delta \rightarrow -\frac{1}{r} \leq \frac{x}{r} + 1 \leq \frac{\Delta}{r} \Rightarrow D_f = \left[-\frac{1}{r}, \frac{\Delta}{r}\right]$$

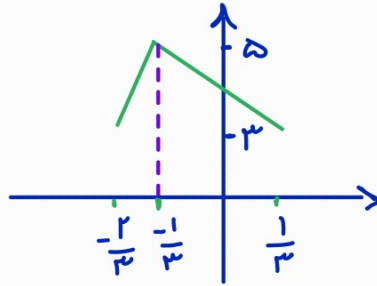
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$$R_{y_1} = [-1, r] \rightarrow -1 \leq f \leq r \rightarrow -\Delta \leq rf - r \leq 1 \rightarrow 0 \leq |rf - r| \leq \Delta$$

$$0 \leq \sqrt{|rf - r|} \leq \sqrt{\Delta} \Rightarrow R_f = [0, \sqrt{\Delta}]$$



$$y = f(r_{n+1})$$



$$y = rf(r_{n+1}) + r$$

-1