

$$f(x) = \frac{x+3}{2x^3 + 3x^2 - 11x + 3}$$

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

$$2x^3 + 3x^2 - 11x + 3 \div x - \frac{1}{2}$$

$$\begin{array}{r} 2x^3 + 3x^2 - 11x + 3 \\ - (2x^3 + x^2 - 3) \\ \hline 2x^2 - 8x + 6 \\ - (2x^2 + x - 1) \\ \hline -9x + 7 \\ - (-9x + \frac{9}{2}) \\ \hline \frac{5}{2} \end{array}$$

$$(x-\frac{1}{2})(x+\frac{4}{3})$$

$$D = \mathbb{R} - \left\{ \frac{1}{2}, 1 \right\}$$

$$g(x) = \frac{x+3}{2x^3 + 4x^2 + 10x + 3}$$

$$= \frac{(x+3)}{(x+1)(x+\frac{1}{2})(x+3)}$$

$$2x^3 + 4x^2 + 10x + 3 \div x + 1$$

$$\begin{array}{r} 2x^3 + 4x^2 + 10x + 3 \\ - (2x^3 + 2x^2 + 2x + 1) \\ \hline 2x^2 + 8x + 2 \\ - (2x^2 + x + \frac{1}{2}) \\ \hline 7x + \frac{3}{2} \\ - (7x + \frac{7}{2}) \\ \hline -2 \end{array}$$

$$(x+\frac{1}{2})(x+\frac{4}{3})$$

$$D = \mathbb{R} - \left\{ -\frac{1}{2}, -\frac{1}{3} \right\}$$

$$h(x) = \frac{x+3}{x^3 - 2x^2 + 2x - 1}$$

$$\rightarrow \frac{(x+3)}{(x-1)(x^2 - x + 1)}$$

$$x^3 - 2x^2 + 2x - 1 \div x - 1$$

$$\begin{array}{r} x^3 - 2x^2 + 2x - 1 \\ - (x^3 - x^2 + x - 1) \\ \hline -x^2 + x \\ - (-x^2 + x - 1) \\ \hline 0 \end{array}$$

$$D = \mathbb{R} - \{1\}$$

$$i) y = \sqrt{\frac{x+3}{x^2-2x^2+x-1}} \rightarrow \sqrt{\frac{x+3}{x-1}} \rightarrow \frac{x+3}{x-1} \geq 0$$

$$\begin{array}{r} x^2 - 2x^2 + x - 1 \mid x-1 \\ -x^2 + x \\ \hline -x^2 + x - 1 \\ +x^2 - x \\ \hline -x - 1 \end{array}$$

$$-x^2 + x - 1$$

$$+x^2 - x$$

$$-x - 1$$

$$-x + 1$$

$$0$$

$$\hookrightarrow \Delta \leq 0$$

$$\frac{-3 \pm 1}{+4 - 5} = \frac{-3 \pm 1}{-1}$$

$$D = (-\infty, -1] \cup (0, +\infty)$$

$$y = \frac{x}{x^2 - \omega(x-1) - 2x + \omega} \neq 0$$

$$\textcircled{1} x^2 - \omega x + \omega - 2x + \omega \neq 0$$

$$x^2 - (\omega+2)x + 2\omega \neq 0$$

$$(x-\omega)(x-2) \neq 0$$

$$x \neq \omega$$

$$\hookrightarrow x \neq 2$$

$$D = \mathbb{R} - \{-3, 0, 2, \omega\}$$

$$\textcircled{2} x^2 + \omega x - \omega - 2x + \omega \neq 0$$

$$x^2 + (\omega-2)x \neq 0$$

$$x(x+\omega-2) \neq 0$$

$$x \neq 0$$

$$\hookrightarrow x \neq -\omega$$

$$iii) y = \sqrt{[x] - 2} \rightarrow [x] - 2 \geq 0 \rightarrow [x] \geq 2$$

$$-x \geq 2$$

$$x \leq -2$$

$$D = (-\infty, -2]$$

$$i) y = \frac{\omega x^2 + 4}{[x]^2 - 2[x] - 3} \neq 0 \rightarrow [x]^2 - 2[x] - 3 \neq 0$$

$$([x]-3)([x]+1) \neq 0$$

$$([x]-3)([x]+1) \neq 0$$

$$[x] \neq 3$$

$$\hookrightarrow [x] \neq -1$$

$$\downarrow$$

$$3 \leq x < 4$$

$$\downarrow$$

$$-1 \leq x < 0$$

$$D = \mathbb{R} - ([-1, 0) \cup [3, 4))$$

الف) $\sqrt{\left[x - \frac{1}{w}\right] + \left[x + \frac{1}{w}\right]}$

$$\left[x - \frac{1}{w}\right] + \left[x + \frac{1}{w}\right] \geq 0$$

$$x + \frac{1}{w} = x - \frac{1}{w} + 1$$

$$* [x+1] = [x] + 1$$

$$\left[x + \frac{1}{w}\right] = \left[x - \frac{1}{w} + 1\right] = \left[x - \frac{1}{w}\right] + 1$$

$$2\left[x - \frac{1}{w}\right] + 1 \geq 0 \rightarrow 2\left[x - \frac{1}{w}\right] \geq -1$$

$$\left[x - \frac{1}{w}\right] \geq 0$$

$$x - \frac{1}{w} \geq 0 \rightarrow x \geq \frac{1}{w}$$

$$D = \left[\frac{1}{w}, +\infty\right)$$

ب) $y = \sqrt{\left[x - \frac{1}{w}\right] + \left[\frac{1}{w} - x\right]}$

$$\left[x - \frac{1}{w}\right] + \left[\frac{1}{w} - x\right] \geq 0$$

$$t = x - \frac{1}{w} \rightarrow \frac{1}{w} - x = -t \rightarrow [t] + [-t] \geq 0$$

$$t + [-t] \Rightarrow \begin{cases} 0 \rightarrow t \in \mathbb{Z} \\ -1 \rightarrow t \notin \mathbb{Z} \end{cases}$$

$$x - \frac{1}{w} \in \mathbb{Z}$$

$$D = \left\{x \mid x = k + \frac{1}{w}, k \in \mathbb{Z}\right\}$$

الف) $\frac{\cot x + 1}{\tan x + 1} \neq 0$

① $\tan x + 1 \neq 0 \rightarrow \tan x \neq -1 \rightarrow x \neq k\pi - \frac{\pi}{4}$

② $\cos x \neq 0 \rightarrow x \neq k\pi + \frac{\pi}{2}$

③ $\sin x \neq 0 \rightarrow x \neq k\pi$

$$D = \mathbb{R} - \left\{k\pi - \frac{\pi}{4}, k\pi, k\pi + \frac{\pi}{2}\right\}$$

$$\therefore y = \sqrt{1 - \varepsilon \sin x} \rightarrow 1 - (\sin x) \geq 0 \rightarrow \sin x \leq \frac{1}{\varepsilon} \rightarrow -\frac{1}{\varepsilon} \leq \sin x \leq \frac{1}{\varepsilon}$$

$$D = \left\{ x \mid k\pi - \frac{\pi}{4} \leq x \leq k\pi + \frac{\pi}{4} \right\} \cup \left\{ x \mid k\pi + \frac{3\pi}{4} \leq x \leq k\pi + \frac{5\pi}{4} \right\} \rightarrow \begin{cases} \textcircled{1} & 0 \leq x \leq \frac{\pi}{4} \\ \textcircled{2} & \frac{3\pi}{4} \leq x \leq \frac{5\pi}{4} \end{cases}$$

$$\downarrow \rightarrow D = \left[k\pi - \frac{\pi}{4}, k\pi + \frac{\pi}{4} \right]$$

$$\text{الف) } y = \sqrt{\varepsilon \sin x - 1} \rightarrow \varepsilon \sin x - 1 \geq 0 \rightarrow \sin x \geq \frac{1}{\varepsilon}$$

$$\frac{\pi}{4} \leq x \leq \frac{3\pi}{4}$$

$$D = \left[k\pi + \frac{\pi}{4}, k\pi + \frac{3\pi}{4} \right]$$



$$\therefore y = \sqrt{1 - \varepsilon \cos x} \rightarrow 1 - \varepsilon \cos x \geq 0 \rightarrow \cos x \leq \frac{1}{\varepsilon}$$

$$\frac{\pi}{4} \leq x \leq \frac{3\pi}{4}$$

$$D = \left[k\pi + \frac{\pi}{4}, k\pi + \frac{3\pi}{4} \right]$$



$$\text{ب) } y = \arcsin(x^2 + 3x + 1) \rightarrow -1 \leq x^2 + 3x + 1 \leq 1$$

$$\textcircled{1} \begin{aligned} x^2 + 3x + 1 &\geq -1 \\ x^2 + 3x + 2 &\geq 0 \\ (x+1)(x+2) &\geq 0 \\ \begin{array}{cc} -2 & -1 \\ + & - & + \\ \hline & & \\ \end{array} \end{aligned}$$

$$\textcircled{2} \begin{aligned} x^2 + 3x + 1 &\leq 1 \\ x^2 + 3x &\leq 0 \\ x(x+3) &\leq 0 \\ \begin{array}{cc} -3 & 0 \\ + & - & + \\ \hline & & \\ \end{array} \end{aligned}$$

$$\textcircled{1} \cap \textcircled{2} \rightarrow D = [-3, -2] \cup [-1, 0]$$

$$\cos y = \sqrt{\omega - \varepsilon x} \rightarrow 0 \leq \sqrt{\omega - \varepsilon x} \leq 1 \rightarrow \omega - \varepsilon x \leq 1 \rightarrow x \geq \frac{\omega - 1}{\varepsilon}$$

$$\textcircled{1} \omega - \varepsilon x \geq 0 \rightarrow \omega \geq \varepsilon x \rightarrow x \leq \frac{\omega}{\varepsilon}$$

$$D = \left[\frac{\omega - 1}{\varepsilon}, \frac{\omega}{\varepsilon} \right]$$

$$\text{الف) } y = \log_x (1 - \log_x^x)$$

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$$\textcircled{1} x > 0$$

$$\textcircled{2} 1 - \log_x^x > 0 \rightarrow \log_x^x < 1 \rightarrow x < 3$$

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$$\textcircled{1} \cap \textcircled{2} \rightarrow D = (0, 3)$$

$$= y = \log_x (1 - \log_x^x)$$

$$\textcircled{1} x > 0$$

$$\textcircled{2} 1 - \log_{\frac{1}{x}}^x > 0 \rightarrow \log_{\frac{1}{x}}^x < 1 \rightarrow x < \frac{1}{x}$$

چون متناهی است

$$\log_{\frac{1}{x}}^x < 1 \rightarrow x > \frac{1}{x} \rightarrow D_f = (\frac{1}{x} + \infty)$$

صحت نامعادله تغییر میکند

$$\textcircled{1} \cap \textcircled{2} \rightarrow D = (0, \frac{1}{x})$$

$$\text{ب) } y = \sqrt{x^2 - x^2 - 1} > 0 \rightarrow x^2 - x^2 - 1 > 0$$

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$$x^2 - x^2 - 1 > 0$$

$$x^2 - x^2 - 1 > 0$$

$$x^2 - x^2 - 1 > 0$$

$$x^2 - x^2 - 1 > 0$$

$$(x - 3)(x - 1) \leq 0$$

$$x = 3$$

$$x = 1$$

$$D = [1, 3]$$

s.a.m

$$\Rightarrow y = \left(\frac{v_n + \omega}{v_n + \varepsilon} \right)!$$

$$\frac{v_n + \omega}{v_n + \varepsilon}$$

$$Cw \rightarrow v_n w + \varepsilon w = v_n w + \omega$$

$$v_n w - v_n w = \omega - \varepsilon w$$

$$x(v_n w - v_n) = \omega - \varepsilon w$$

$$x = \frac{\omega - \varepsilon w}{v_n w - p}$$

$$D = \left\{ x \mid x = \frac{\omega - \varepsilon w}{v_n w - p}, w \in W \right\}$$

$$9 - \text{ب}) \quad y = \log_r \left(1 - \log^{\frac{n}{r}} \frac{1}{r} \right) \rightarrow \log^{\frac{n}{r}} \frac{1}{r} \rightarrow n > 0.$$

$$\hookrightarrow 1 - \log^{\frac{n}{r}} \frac{1}{r} > 0 \rightarrow \log^{\frac{n}{r}} \frac{1}{r} < 1 \xrightarrow{\text{منابع (0,1)}} n > \frac{1}{r}$$

$$Df_2 \left(\frac{1}{r}, +\infty \right)$$