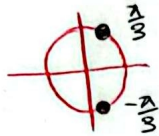


$$1 \cos \alpha = 1 + \tan^2 \alpha$$

$$\text{پس داریم } \frac{1}{\cos^2 \alpha} = 1 + \tan^2 \alpha \quad (1)$$

$$\textcircled{1} \quad 1 \cos \alpha = \frac{1}{\cos^2 \alpha} \rightarrow \cos^2 \alpha = \frac{1}{\alpha} \rightarrow \cos \alpha = \frac{1}{\sqrt{3}} \rightarrow \cos \alpha = \cos \frac{\pi}{3}$$

$$\alpha = 2k\pi \pm \frac{\pi}{3}$$



رو جواب دارد.

$$\cos^3 \alpha = 4 \cos^2 \alpha - 3 \cos \alpha \quad (1)$$

$$\text{پس داریم } \sin^2 \alpha = 1 - \cos^2 \alpha \quad (2)$$

$$\textcircled{1} \text{ و } \textcircled{2} \text{ عبارت را بازنویسی کنیم} \quad \omega(1 - \cos^2 \alpha) + 2(4 \cos^2 \alpha - 3 \cos \alpha) + 2 = 0 = 1 \cos^3 \alpha - \omega \cos^2 \alpha - 4 \cos \alpha + 2 = 0$$

$$\xrightarrow{\cos \alpha = t} 1t^3 - \omega t^2 - 4t + 2 = 0 \quad \text{عبارت بر } t+1 \text{ بخشیده و جوابات باقی مانده را به دست آوریم}$$

$$1t^3 - \omega t^2 - 4t + 2 = (t+1)(1t^2 - \omega t + 2) = 0 \quad \begin{matrix} t = -1 \\ \Delta < 0 \rightarrow \text{جواب ندارد} \end{matrix} \quad \cos \alpha = -1 \rightarrow \cos \alpha = \cos \pi \rightarrow \alpha = 2k\pi \pm \pi$$

رو جواب دارد.

$$\alpha = \pi \quad \text{و} \quad \alpha = -\pi$$

$$2 \sin \alpha \cos \alpha + \sin \alpha = 1$$

$$\frac{\pi}{3} + \frac{\omega \pi}{3} + \frac{\pi}{3} = \frac{\omega \pi}{3}$$

$$2 \sin \alpha (1 - 2 \sin^2 \alpha) + \sin \alpha = 1 \rightarrow 4 \sin^3 \alpha - 3 \sin \alpha + 1 = 0 \quad \text{جوابات جداگانه فراد و زوج باید بنویسیم}$$

$$\sin \alpha = -1 \rightarrow \sin \alpha = \sin \frac{3\pi}{2} \rightarrow \alpha = 2k\pi + \frac{3\pi}{2} \rightarrow \alpha = 2k\pi + \pi - \frac{\pi}{2}$$

$$\sin \alpha = t \rightarrow \frac{4t^3 - 3t + 1}{t+1} = (t+1)(2t-1)^2 \quad \begin{matrix} 4t^3 - 3t + 1 \\ -4t^3 - 4t^2 \\ \hline -4t^2 - 3t + 1 \\ -4t^2 - 4t \\ \hline t + 1 \end{matrix} \quad \begin{matrix} \frac{t+1}{t+1} \\ \hline 1 \end{matrix} = (t+1)(2t-1)^2$$

$$\sin \alpha = \frac{1}{2} \rightarrow \sin \alpha = \sin \frac{\pi}{6} \rightarrow \alpha = 2k\pi + \frac{\pi}{6} \quad \text{و} \quad \alpha = 2k\pi + \frac{5\pi}{6}$$

$$\frac{1}{\cos^2 \alpha} - \frac{1}{\sin^2 \alpha} = 0 \rightarrow \frac{1}{\cos^2 \alpha} = \frac{1}{\sin^2 \alpha} \rightarrow \cos^2 \alpha = \sin^2 \alpha \rightarrow \cos \alpha = 2 \sin \alpha \cos \alpha$$

$\cos \alpha \neq 0$ چون در غیر این صورت در مخرج صفر داریم.
پس می توانیم از دو طرف معادله ساده کنیم.

$$\sin 2\alpha = \frac{1}{2} \rightarrow 2\alpha = 2k\pi + \frac{\pi}{6} \rightarrow \alpha = k\pi + \frac{\pi}{12} \quad \text{و} \quad 2\alpha = 2k\pi + \frac{5\pi}{6} \rightarrow \alpha = k\pi + \frac{5\pi}{12}$$

$$\sin 2\alpha = \sin \frac{\pi}{6} \quad \alpha \in [0, \pi] \rightarrow \alpha = \frac{\pi}{12} \quad \text{و} \quad \frac{5\pi}{12} \rightarrow \alpha = \frac{5\pi}{12} - \frac{\pi}{12} = \frac{\pi}{3}$$

$$\tan 2\alpha = \tan \frac{\pi}{3} = -\tan \frac{\pi}{3} = -\sqrt{3}$$

$$\cos \left(\alpha + \frac{\pi}{6} \right) = \frac{1}{\sqrt{3}}$$

$$\hookrightarrow \sin \left(\frac{\pi}{6} - \alpha \right) \rightarrow -\sin \left(\alpha - \frac{\pi}{6} \right) = \frac{1}{\sqrt{3}} \quad \begin{matrix} -\sqrt{3}(\sin \alpha - \cos \alpha) \pm \frac{1}{\sqrt{3}} \\ \hline \end{matrix} \xrightarrow{\text{ب توان ۲}} (\sin \alpha - \cos \alpha)^2 = \left(\frac{\sqrt{3}}{3} \right)^2$$

$$\sin^2 \alpha + \cos^2 \alpha - 2 \sin \alpha \cos \alpha = \frac{1}{3} \quad \sin 2\alpha = \frac{1}{\sqrt{3}} \rightarrow \sin 2\alpha = \frac{1}{\sqrt{3}}$$

$$m(\cos \alpha - \sin \alpha) = \frac{2\sqrt{3} \times \frac{1}{\sqrt{3}}}{\sqrt{3}} = \sqrt{3} \rightarrow m = \frac{2\sqrt{3} \times \sqrt{3}}{\sqrt{3}} \rightarrow \boxed{m = 6}$$

$$\sin\left(m + \frac{\pi}{6}\right) \cos\left(m - \frac{\pi}{6}\right) = 1$$

$$m + \frac{\pi}{6} + \frac{\pi}{6} - m = \frac{\pi}{3} \quad \text{جمع زوایاں ۹۰}$$

$$\sin\left(m + \frac{\pi}{6}\right)^2 = 1 \quad \begin{cases} \sin\left(m + \frac{\pi}{6}\right) = 1 \rightarrow m + \frac{\pi}{6} = 2k\pi + \frac{\pi}{6} \\ \sin\left(m + \frac{\pi}{6}\right) = -1 \rightarrow m + \frac{\pi}{6} = 2k\pi + \frac{5\pi}{6} \end{cases}$$

↓
رابطه $\sin A = \cos B$ معکوس

$$m = 2k\pi + \frac{\pi}{3}$$

$$m = 2k\pi + \frac{5\pi}{3}$$

$$\frac{\pi}{3}, \frac{5\pi}{3} \rightarrow \text{جواب دارد}$$

$$\sin m + \sqrt{3} \cos m = \sqrt{2} \xrightarrow{\text{تقسیم بر } \sqrt{2}} \frac{1}{\sqrt{2}} \sin m + \frac{\sqrt{3}}{\sqrt{2}} \cos m = \frac{\sqrt{2}}{\sqrt{2}}$$

$$\sin\left(m + \frac{\pi}{6}\right) = \frac{\sqrt{2}}{2} \quad \begin{cases} m + \frac{\pi}{6} = 2k\pi + \frac{\pi}{6} \rightarrow m = 2k\pi \\ m + \frac{\pi}{6} = 2k\pi + \frac{5\pi}{6} \rightarrow m = 2k\pi + \frac{2\pi}{3} \end{cases}$$



$$\text{جواب ها: } -\frac{\pi}{12}, \frac{5\pi}{12}, \frac{2\pi}{3} \xrightarrow{\text{جمع}} \frac{2\pi}{3} = \frac{4\pi}{6}$$

$$f \sin m (-\cos m) = 1$$

$$\sin\left(\frac{\pi}{6} - m\right) = -\cos m$$

$$f \sin 2m = -1 \rightarrow \sin 2m = -\frac{1}{f} \rightarrow \sin 2m = \sin -\frac{\pi}{6}$$

$$2m = 2k\pi - \frac{\pi}{6} \rightarrow m = k\pi - \frac{\pi}{12} \quad k=1 \rightarrow m = \frac{11\pi}{12}$$

$$2m = 2k\pi + \frac{5\pi}{6} \rightarrow m = k\pi + \frac{5\pi}{12} \rightarrow k=0 \rightarrow m = \frac{5\pi}{12}$$

$$\frac{5\pi}{12} + \frac{11\pi}{12} = \frac{16\pi}{12} = \frac{4\pi}{3}$$

$$\frac{(1 + \cos^2 \alpha)(1 + \cos^2 \beta)(1 + \cos^2 \gamma)}{(1 + \cos^2 \alpha)(1 + \cos^2 \beta)(1 + \cos^2 \gamma)} = \frac{1}{\lambda} \quad \rightarrow \quad (\cos \alpha \cdot \cos \beta \cdot \cos \gamma)^2 = \frac{1}{4\lambda}$$

$$\cos \alpha \cdot \cos \beta \cdot \cos \gamma = \pm \frac{1}{\lambda} \quad \times \sin \alpha \quad \times \sin \beta \quad \times \sin \gamma \quad \rightarrow \quad \sin \alpha \cos \alpha \cdot \cos \beta \cdot \cos \gamma = \pm \sin \alpha$$

$$\sin 2\alpha = \pm \sin \alpha$$

$$\sin 2\alpha = \sin \alpha \rightarrow 2\alpha = 2k\pi + \alpha \rightarrow \alpha = 2k\pi$$

$$\sin 2\alpha = \sin -\alpha \rightarrow 2\alpha = 2k\pi - \alpha \rightarrow \alpha = \frac{2k\pi}{3} \rightarrow \max \frac{2\pi}{3}$$

$$\max = \frac{2\pi}{3}$$

$$\tan \psi \tan \alpha = 1 \rightarrow \tan \psi = \frac{1}{\tan \alpha} \rightarrow \tan \psi = \cot \alpha$$

$$\tan \psi = \tan\left(\frac{\pi}{2} - \alpha\right) \rightarrow \psi = k\pi + \frac{\pi}{2} - \alpha \rightarrow \psi = k\pi + \frac{\pi}{2} \rightarrow m = \frac{k\pi}{2} + \frac{\pi}{2}$$

$$k=0 \rightarrow m = \frac{\pi}{2} \quad \times$$

$$k=1 \rightarrow m = \frac{3\pi}{2}$$

$$k=1 \rightarrow m = \frac{3\pi}{2} \quad \times$$

$$k=2 \rightarrow m = \frac{5\pi}{2}$$

$$k=2 \rightarrow m = \frac{5\pi}{2} \quad \times$$

$$k=3 \rightarrow m = \frac{7\pi}{2}$$

$$k=3 \rightarrow m = \frac{7\pi}{2} \quad \times$$

$$k=4 \rightarrow m = \frac{9\pi}{2}$$

$$\frac{9\pi}{2} + \frac{11\pi}{2} + \frac{13\pi}{2} + \frac{15\pi}{2} = \frac{48\pi}{2} = 24\pi$$

در رابطه (۱) مورد نظر قرار ندهیم

[۲، ۱]

در رابطه (۱)