

$$\sin \alpha = r \cos \alpha \Rightarrow \tan \alpha = r \quad \frac{1}{\cos^2 \alpha} = 1 + \tan^2 \alpha = 2 \Rightarrow \cos^2 \alpha = \frac{1}{2} \quad -v$$

$$\Rightarrow \cos \alpha = -\frac{1}{\sqrt{2}} = -\frac{\sqrt{2}}{2} \quad (5)$$

$$r m x + (m^2 - 1) y = r \Rightarrow y = \left(\frac{-r m}{m^2 - 1} \right) x + \frac{r}{m^2 - 1} \quad -\Delta$$

$$\tan \alpha = \frac{-r m}{m^2 - 1} \Rightarrow \tan \phi_0 = \sqrt{r} = \frac{-r m}{m^2 - 1} \Rightarrow -r m = \sqrt{r} m^2 - \sqrt{r} \Rightarrow \sqrt{r} m^2 + r m - \sqrt{r} = 0$$

$$\Rightarrow m = \frac{1}{\sqrt{r}} \text{ or } \frac{-r}{\sqrt{r}} \Rightarrow m_2 - m_1 = \frac{1}{\sqrt{r}} + \frac{r}{\sqrt{r}} = \frac{1+r}{\sqrt{r}} = \frac{r+\sqrt{r}}{\sqrt{r}} \quad (5)$$

$$\tan\left(\frac{\pi}{4} - \alpha\right) = \frac{1-m}{r+m} \quad -\frac{\pi}{4} < \alpha < \frac{\pi}{4} \Rightarrow 0 < \frac{\pi}{4} - \alpha < \frac{\pi}{4} \quad \text{Diagram: Circle with axes, angle marked } \frac{\pi}{4}$$

$$\Rightarrow 0 < \tan\left(\frac{\pi}{4} - \alpha\right) < 1 \Rightarrow 0 < \frac{1-m}{r+m} < 1 \Rightarrow \textcircled{1} \quad \frac{-r}{-r+m} < 1 \quad \left. \begin{array}{l} \textcircled{1} \\ \textcircled{2} \end{array} \right\} m \in \left(-\frac{1}{r}, 1\right)$$

$$\textcircled{2} \quad \frac{1-r-r-m}{r+m} < 0 \Rightarrow \frac{-r m - 1}{r+m} < 0 \quad \frac{-r}{-r+m} < 1$$

$$\tan \phi_0 \cdot \cos \phi_0 + \tan \alpha \cdot \sin \alpha \phi_0 = \tan(\pi/4 - \phi_0) \cos(\pi/4 + \phi_0) + \tan(\pi/4 - \phi_0) \sin(\pi/4 - \phi_0) \quad -10$$

$$= -\tan \phi_0 (-\cos \phi_0) - \tan \phi_0 (+\sin \phi_0) = -\sqrt{r} x \frac{\sqrt{r}}{r} - \sqrt{r} x \frac{\sqrt{r}}{r} = \frac{1}{r} - \frac{1}{r} = 0 \quad (5)$$

$$4) \quad -\frac{\pi}{4} < \alpha < \frac{\pi}{4} \longrightarrow \alpha - \frac{\pi}{4} < \frac{\pi}{4}$$

لأن در ربع اول است ← + لانه است ← $\frac{1-m}{r+m} > 0 \Rightarrow m \in (-1, 1)$