

$$c) z = 2 \sin \omega t + 3 \cos \omega t$$

$$\begin{cases} A \cos \alpha = 3 \\ A \sin \alpha = -2 \end{cases} \quad A^2 = 4 + 9 = 13 \quad A = \sqrt{13}$$

$$\boxed{\alpha = \tan^{-1}\left(-\frac{2}{3}\right)}$$

$$\alpha = -0.58$$

$$-\frac{\pi}{2} \leq \alpha \leq 0$$

$$d) z = \sin \omega t - 2 \cos(\omega t - \pi/4) + \cos \omega t$$

$$= \sin \omega t - 2 \cos(\omega t) \cos \frac{\pi}{4} - 2 \sin \omega t \sin \frac{\pi}{4} + \cos \omega t$$

$$\quad \quad \quad \downarrow \quad \quad \quad \downarrow$$

$$\quad \quad \quad \frac{\sqrt{2}}{2} \quad \quad \quad \frac{\sqrt{2}}{2}$$

$$= (1 - \sqrt{2}) \cos \omega t + (1 - \sqrt{2}) \sin \omega t$$

$$\begin{cases} A \cos \alpha = 1 - \sqrt{2} \\ A \sin \alpha = -(1 - \sqrt{2}) \end{cases}$$

$$A^2 = (1 - 2\sqrt{2} + 2) \cdot 2 = (2 - \sqrt{2})^2$$

$$\boxed{A = 2 - \sqrt{2}}$$

$$\alpha = \tan^{-1}\left(\frac{\sqrt{2}-1}{\sqrt{2}-1}\right)$$

$$\frac{\pi}{2} \leq \alpha \leq \pi$$

$$\boxed{\alpha = \frac{3\pi}{4}}$$