

α を実数とす。

$$\alpha^5 i + \alpha^7 + \alpha^3 i - \alpha^2 - a \alpha i - \alpha i + a = 0$$

$$\begin{cases} \alpha^5 + \alpha^3 - a \alpha - \alpha = 0 \\ \alpha^4 - \alpha^2 + a = 0 \end{cases}$$

$$\begin{cases} \alpha^4 - \alpha^2 + a = 0 \end{cases}$$

が成り立つのはよい。

$$a = -\alpha^4 + \alpha^2$$

$$\alpha^5 + \alpha^3 + \alpha^5 - \alpha^3 - \alpha = 0, \quad \alpha(2\alpha^4 - 1) = 0, \quad \alpha = 0 \text{ または } \alpha^4 = \frac{1}{2}, \quad \alpha^2 = \frac{1}{\sqrt{2}}$$

$$\text{よって } a = 0, \text{ または } -\frac{1}{2} + \frac{1}{\sqrt{2}} = \frac{\sqrt{2}-1}{2}$$