

第9回 加法定理(1)《例題》

① 2点ABの距離は

$$\begin{aligned} & AB^2 \\ &= (\cos \alpha - \cos \beta)^2 + (\sin \alpha - \sin \beta)^2 \\ &= \cos^2 \alpha - 2 \cos \alpha \cos \beta + \cos^2 \beta \\ &\quad + \sin^2 \alpha - 2 \sin \alpha \sin \beta + \sin^2 \beta \\ &= 2 - 2(\cos \alpha \cos \beta + \sin \alpha \sin \beta) \cdots \textcircled{1} \end{aligned}$$

また、 $\triangle OAB$ で余弦定理より

$$\begin{aligned} AB^2 &= 1 + 1 - 2 \cdot 1 \cdot 1 \cos(\alpha - \beta) \\ &= 2 - 2 \cos(\alpha - \beta) \cdots \textcircled{2} \end{aligned}$$

①, ②より

$$\cos(\alpha - \beta) = \cos \alpha \cos \beta + \sin \alpha \sin \beta$$

② (1) $\frac{\sqrt{6} - \sqrt{2}}{4}$

(2) $-\frac{\sqrt{6} - \sqrt{2}}{4}$