

Trigonometric Function

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1 Formulas

- ピタゴラスの定理

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

$$\tan = \frac{\sin}{\cos}$$

$$1 + \tan = \frac{1}{\sin}$$

$$1 + \frac{1}{\tan^2} = \frac{1}{\cos}$$

- 加法定理 (addition theorem)

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

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

$$\tan(\alpha + \beta) = \tan \alpha + \tan \beta / 1 \pm \tan \alpha \tan \beta$$

- 半角公式 (half-triangle formulas)

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

$$\cos^2 \frac{\alpha}{2} = \frac{1 + \cos \alpha}{2}$$

$$\tan^2 \frac{\alpha}{2} = \frac{1 - \cos \alpha}{1 + \cos \alpha}$$

- 倍角公式 (double-angle formulas)

$$\sin 2\alpha = 2 \sin \alpha \cos \alpha$$

$$\cos 2\alpha = \cos^2 \alpha - \sin^2 \alpha = 2 \cos^2 \alpha - 1 = 1 - 2 \sin^2 \alpha$$

$$\tan 2\alpha = \frac{2 \tan \alpha}{1 - \tan^2 \alpha}$$

- 積和の公式 (product-to-sum)

$$\sin \cos = \frac{\sin(\alpha + \beta) + \cos(\alpha - \beta)}{2}$$