Trigonométrie

Formules d'addition et de soustraction

$$\cos(a+b) = \cos a \cos b - \sin a \sin b$$

$$\sin(a+b) = \sin a \cos b + \cos a \sin b$$

$$\tan(a+b) = \frac{\tan a + \tan b}{1 - \tan a \tan b}$$

$$\cos(a - b) = \cos a \cos b + \sin a \sin b$$

$$\sin(a-b) = \sin a \cos b - \cos a \sin b$$

$$\tan(a+b) = \frac{\tan a + \tan b}{1 - \tan a \tan b}$$
$$\tan(a-b) = \frac{\tan a - \tan b}{1 + \tan a \tan b}$$

Cas particuliers

$$\cos\left(x + \frac{\pi}{2}\right) = -\sin x$$

$$\sin\left(x + \frac{\pi}{2}\right) = \cos x$$

$$\tan\left(x + \frac{\pi}{2}\right) = -\frac{1}{\tan x}$$

$$\cos\left(x - \frac{\pi}{2}\right) = \sin x$$

$$\sin\left(x - \frac{\pi}{2}\right) = -\cos x$$

$$\tan\left(x - \frac{\pi}{2}\right) = -\frac{1}{\tan x}$$

$$\cos\left(\frac{\pi}{2} - x\right) = \sin x$$

$$\sin\left(\frac{\pi}{2} - x\right) = \cos x$$

$$\tan\left(\frac{\pi}{2} - x\right) = \frac{1}{\tan x}$$

$$\cos(x + n\pi) = (-1)^n \cos x$$

$$\sin(x + n\pi) = (-1)^n \sin x$$

Formules de duplication

$$\cos 2a = \cos^2 a - \sin^2 a$$

$$\sin 2a = 2\sin a\cos a$$

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

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

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

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

Formules de factorisation

$$\cos a + \cos b = 2\cos\frac{a+b}{2}\cos\frac{a-b}{2}$$

$$\cos a - \cos b = -2\sin\frac{a+b}{2}\sin\frac{a-b}{2}$$

$$\sin a + \sin b = 2\sin \frac{a+b}{2}\cos \frac{a-b}{2}$$

$$\sin a - \sin b = 2\cos\frac{a+b}{2}\sin\frac{a-b}{2}$$

Formules de linéarisation

$$\cos a \cos b = \frac{1}{2} \left(\cos(a+b) + \cos(a-b) \right)$$

$$\sin a \sin b = \frac{1}{2} \left(\cos(a-b) - \cos(a+b) \right)$$

$$\sin a \cos b = \frac{1}{2} \left(\sin(a+b) + \sin(a-b) \right)$$

$$\cos a \sin b = \frac{1}{2} \left(\sin(a+b) - \sin(a-b) \right)$$

Paramétrage rationnel du cercle trigonométrique

$$\cos\theta = \frac{1 - t^2}{1 + t^2}$$

$$\sin\theta = \frac{2t}{1+t^2}$$

$$\tan \theta = \frac{2t}{1 - t^2}$$

$$\left(\operatorname{avec} t = \tan\frac{\theta}{2}\right)$$

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