Trigonométrie

Formules d'addition et de soustraction

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

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

Cas particuliers

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

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

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

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

Formules de duplication

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

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

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

Formules de factorisation

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

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

Formules de linéarisation

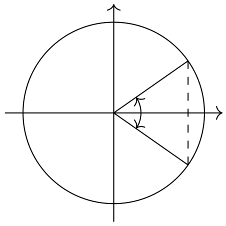
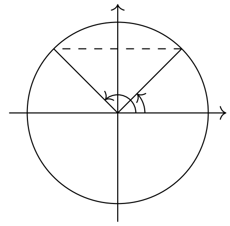
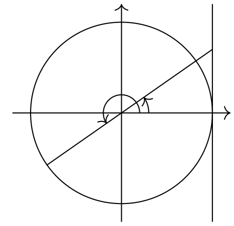
$$\cos a \cos b = \frac{1}{2}\left(\cos(a+b) + \cos(a-b)\right) \qquad \sin a \sin b = \frac{1}{2}\left(\cos(a-b) - \cos(a+b)\right)$$

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

Paramétrage rationnel du cercle trigonométrique

$$\cos\theta = \frac{1-t^2}{1+t^2} \qquad \sin\theta = \frac{2t}{1+t^2} \qquad \tan\theta = \frac{2t}{1-t^2} \qquad \left(\text{avec } t = \tan\frac{\theta}{2}\right)$$

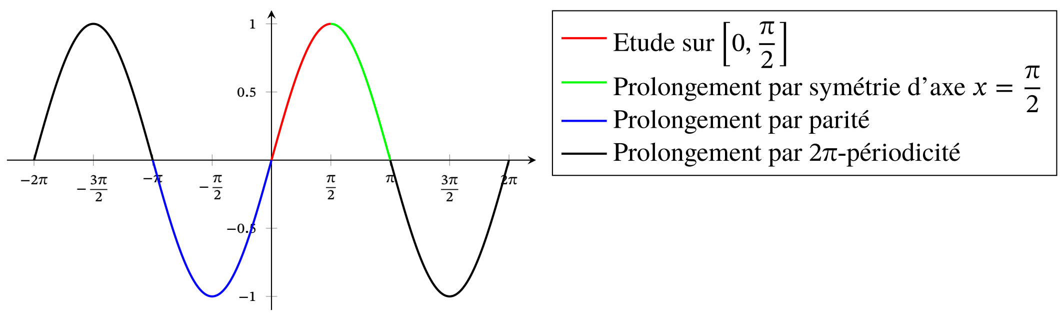
Equations trigonométriques

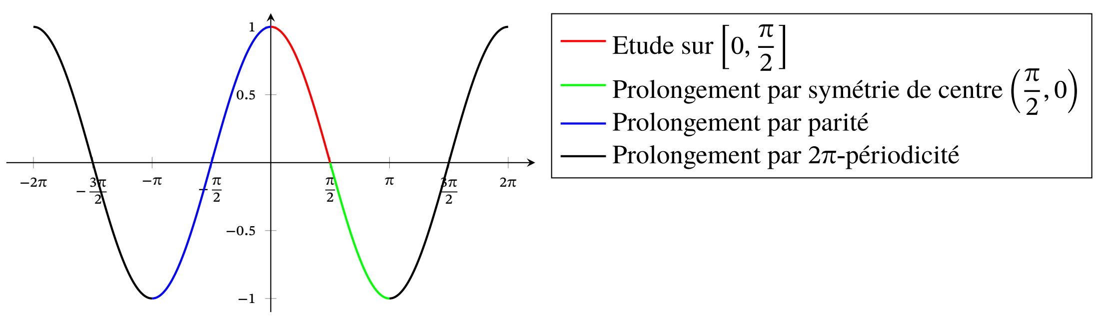
$$\cos a = \cos b \Leftrightarrow \begin{cases} a \equiv b[2\pi] \\ \text{ou} \\ a \equiv -b[2\pi] \end{cases} \qquad \sin a = \sin b \Leftrightarrow \begin{cases} a \equiv b[2\pi] \\ \text{ou} \\ a \equiv \pi - b[2\pi] \end{cases} \qquad \tan a = \tan b \Leftrightarrow a \equiv b[\pi]$$

Graphes

Graphe de sin



Graphe de cos



Graphe de tan