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

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

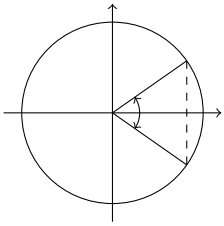
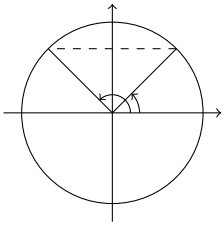
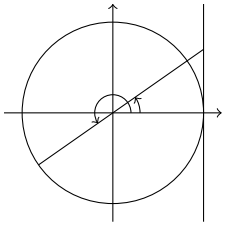
Formules de linéarisation

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

Paramétrage rationnel du cercle trigonométrique

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

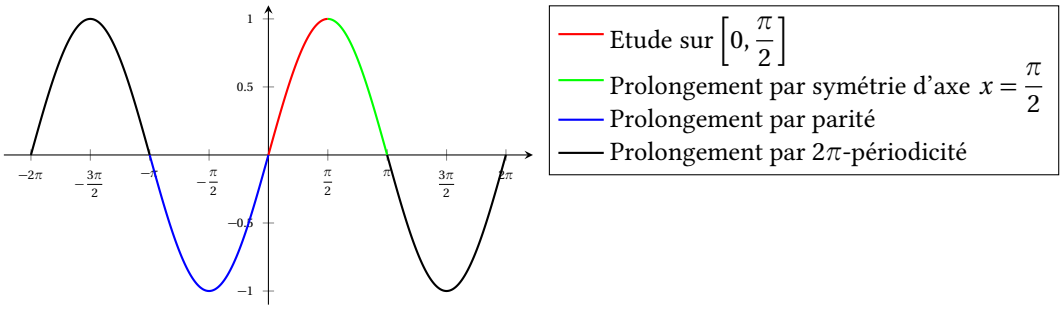
Equations trigonométriques

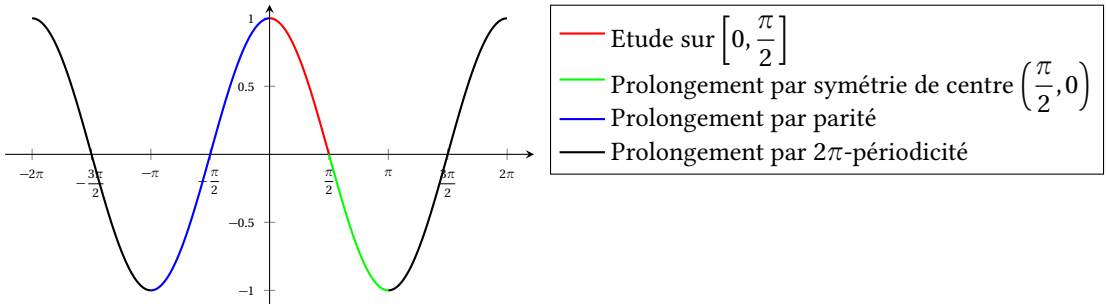
$$\cos a = \cos b \Leftrightarrow \begin{cases} a \equiv b[2\pi] \\ \text{ou} \\ a \equiv -b[2\pi] \end{cases} \qquad \sin a = \sin b \Leftrightarrow \begin{cases} a \equiv b[2\pi] \\ \text{ou} \\ a \equiv \pi - b[2\pi] \end{cases} \qquad \tan a = \tan b \Leftrightarrow a \equiv b[\pi]$$

Graphes

Graphe de sin



Graphe de cos



Graphe de tan