FORMULAIRE DE TRIGONOMETRIE / FONCTIONS

R&T Saint-Malo - 2007/2008

Formules de duplication

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

- $\cosh^2 x - \sinh^2 x = 1$
- $\cosh 2x = 2\cosh^2 x - 1$
  $= 1 + 2\sinh^2 x$
  $= \cosh^2 x + \sinh^2 x$
- $\sinh 2x = 2 \sinh x \cosh x$

Formules d'addition

- $\cos(u+v) = \cos u \cos v - \sin u \sin v$
- $\cos(u-v) = \cos u \cos v + \sin u \sin v$
- $\sin(u+v) = \sin u \cos v + \cos u \sin v$
- $\sin(u-v) = \sin u \cos v - \cos u \sin v$

- $\cosh(u+v) = \cosh u \cosh v + \sinh u \sinh v$
- $\cosh(u-v) = \cosh u \cosh v - \sinh u \sinh v$
- $\sinh(u+v) = \sinh u \cosh v + \cosh u \sinh v$
- $\sinh(u-v) = \sinh u \cosh v - \cosh u \sinh v$

- $\cos u + \cos v = 2\cos\alpha \cos\beta$
- $\cos u - \cos v = -2\sin\alpha \sin\beta$
- $\sin u + \sin v = 2\sin\alpha \cos\beta$
- $\sin u - \sin v = 2\cos\alpha \sin\beta$

avec $\alpha = \frac{u+v}{2}$ et $\beta = \frac{u-v}{2}$

- $\cosh u + \cosh v = 2\cosh\alpha \cosh\beta$
- $\cosh u - \cosh v = 2\sinh\alpha \sinh\beta$
- $\sinh u + \sinh v = 2\sinh\alpha \cosh\beta$
- $\sinh u - \sinh v = 2\cosh\alpha \sinh\beta$

avec $\alpha = \frac{u+v}{2}$ et $\beta = \frac{u-v}{2}$

Formules des angles associés

- $\cos(-x) = \cos x$
- $\cos(\pi - x) = -\cos x$
- $\cos(\pi + x) = -\cos x$
- $\cos(\pi/2 - x) = \sin x$
- $\sin(-x) = -\sin x$
- $\sin(\pi - x) = \sin x$
- $\sin(\pi + x) = -\sin x$
- $\sin(\pi/2 - x) = \cos x$

Angles classiques

x	0	$\pi/6$	$\pi/4$	$\pi/3$	$\pi/2$	π
$\sin x$	0	$1/2$	$\sqrt{2}/2$	$\sqrt{3}/2$	1	0
$\cos x$	1	$\sqrt{3}/2$	$\sqrt{2}/2$	$1/2$	0	-1
$\tan x$	0	$\sqrt{3}/3$	1	$\sqrt{3}$	$\pm\infty$	0

Tangentes et cotangentes

- $\tan(u+v) = \dfrac{\tan u + \tan v}{1 - \tan u \tan v}$
- $\tan(u-v) = \dfrac{\tan u - \tan v}{1 + \tan u \tan v}$

$\forall x \in]-\pi, \pi[$ si $t = \tan x/2$:

- $\cos x = \dfrac{1-t^2}{1+t^2}$
- $\sin x = \dfrac{2t}{1+t^2}$
- $\tan x = \dfrac{2t}{1-t^2}$

Dérivées des fonctions trigo

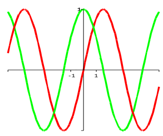
- $\sin' x = \cos x$
- $\cos' x = -\sin x$
- $\sinh' x = \cosh x$
- $\cosh' x = \sinh x$
- $\tan' x = 1/\cos^2 x$
- $cotan' x = -1/\sin^2 x$
- $\tanh' x = 1/\cosh^2 x$
- $cotanh' x = -1/\sinh^2 x$

Fonctions réciproques

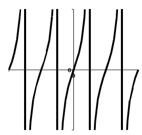
- $arcsin' x = \dfrac{1}{\sqrt{1-x^2}}$
- $arcos' x = -\dfrac{1}{\sqrt{1-x^2}}$
- $argsh' x = \dfrac{1}{\sqrt{x^2+1}}$
- $argch' x = \dfrac{1}{\sqrt{x^2-1}}$
- $arctan' x = \dfrac{1}{1+x^2}$
- $argth' x = \dfrac{1}{1-x^2}$

- $argsh\ x = \ln(x + \sqrt{x^2+1}) \quad \forall x \in \mathbb{R}$
- $argch\ x = \ln(x + \sqrt{x^2-1}) \quad \forall x \geq 1$
- $argth\ x = \dfrac{1}{2} \ln\left(\dfrac{1+x}{1-x}\right) \quad \forall x \in]-1, 1[$

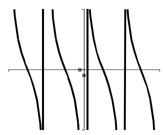
Fonctions usuelles



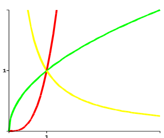
$\sin, \cos$



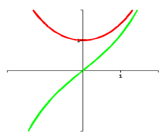
$\tan$



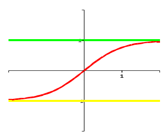
$cotan$



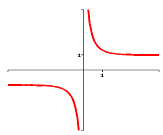
x^α



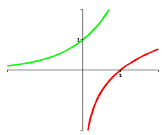
$\cosh, \sinh$



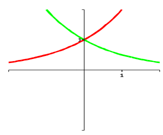
$\tanh$



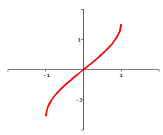
$cotanh$



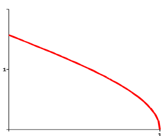
$e^x, \ln x$



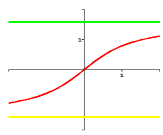
$a^x, a > 0, a < 0$



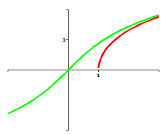
arcsin



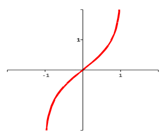
arccos



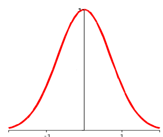
arctan



$argch,\ argsh$



$argth$



e^{-x^2}