FORMULARIO

TRIGONOMETRIA

$\sin^2 x + \cos^2 x = 1;\quad \tan x = \frac{\sin x}{\cos x};\quad \coth x = \frac{\cos x}{\sin x}$

$\sin(-x) = -\sin x;\quad \cos(-x) = \cos x;\quad \sin(\frac{\pi}{2} \pm x) = \cos x;\quad \cos(\frac{\pi}{2} \pm x) = \mp \sin x;$
$\sin(\pi \pm x) = \mp \sin x;\quad \cos(\pi \pm x) = -\cos x;\quad \sin(x + 2\pi) = \sin x;\quad \cos(x + 2\pi) = \cos x;$

$\sin(x \pm y) = \sin x \cos y \pm \cos x \sin y;\quad \cos(x \pm y) = \cos x \cos y \mp \sin x \sin y$

$\sin(2x) = 2 \sin x \cos x;\quad \cos(2x) = \cos^2 x - \sin^2 x = 2\cos^2 x - 1 = 1 - 2\sin^2 x$
$\cos^2 x = \frac{1+\cos(2x)}{2};\quad \sin^2 x = \frac{1-\cos(2x)}{2}$

$\sin u + \sin v = 2 \sin \frac{u+v}{2} \cos \frac{u-v}{2};\quad \sin u - \sin v = 2 \cos \frac{u+v}{2} \sin \frac{u-v}{2};\quad \cos u + \cos v = 2 \cos \frac{u+v}{2} \cos \frac{u-v}{2};$
$\cos u - \cos v = -2 \sin \frac{u+v}{2} \sin \frac{u-v}{2};$

$\sin x \cos y = \frac{1}{2}[\sin(x+y) + \sin(x-y)];\quad \cos x \cos y = \frac{1}{2}[\cos(x+y) + \cos(x-y)];$
$\sin x \sin y = -\frac{1}{2}[\cos(x+y) - \cos(x-y)]$

Posto $t = \tan(x/2)$, si ha: $\sin x = \frac{2t}{1+t^2};\quad \cos x = \frac{1-t^2}{1+t^2};\quad \tan x = \frac{2t}{1-t^2};$

$\sin 0 = 0 \quad \cos 0 = 1 \quad \sin \frac{\pi}{6} = \frac{1}{2};\quad \cos \frac{\pi}{6} = \frac{\sqrt{3}}{2};\quad \sin \frac{\pi}{4} = \frac{\sqrt{2}}{2};\quad \cos \frac{\pi}{4} = \frac{\sqrt{2}}{2};$
$\sin \frac{\pi}{3} = \frac{\sqrt{3}}{2};\quad \sin \frac{\pi}{3} = \frac{1}{2};\quad \sin \frac{\pi}{2} = 1;\quad \cos \frac{\pi}{2} = 0;$

DISUGUAGLIANZE

$|\sin x| \leq |x|$ per ogni $x \in \mathbb{R}$; $\quad 0 \leq 1 - \cos x \leq \frac{x^2}{2}$ per ogni $x \in \mathbb{R}$;

$\log(1+x) \leq x$ per ogni $x > -1$; $\quad |xy| \leq \frac{x^2+y^2}{2};\quad \frac{(x+y)^2}{2} \leq x^2 + y^2;\quad x^4 + y^4 \leq (x^2+y^2)^2$

SVILUPPI DI MACLAURIN

$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots + \frac{x^n}{n!} + o(x^n)$

$\log(1+x) = x - \frac{x^2}{2} + \frac{x^3}{3} + \cdots + (-1)^{n+1}\frac{x^n}{n} + o(x^n)$

$\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} + \cdots + (-1)^n \frac{x^{2n+1}}{(2n+1)!} + o(x^{2n+2})$

$\cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} + \cdots + (-1)^n \frac{x^{2n}}{2n!} + o(x^{2n+1})$

$\tan x = x + \frac{1}{3}x^3 + \frac{2}{15}x^5 + o(x^6)$

$\arctan x = x - \frac{x^3}{3} + \frac{x^5}{5} + \cdots + (-1)^n \frac{x^{2n+1}}{2n+1} + o(x^{2n+2})$

$(1+x)^\alpha = 1 + \alpha x + \frac{\alpha(\alpha-1)}{2!}x^2 + \frac{\alpha(\alpha-1)(\alpha-2))}{3!}x^3 + \cdots + \frac{\alpha(\alpha-1)\cdots(\alpha-n+1)}{n!}x^n + o(x^n)$