FORMULE TRIGONOMETRICHE [1]

Formule notevoli di trigonometria

$$sen^2\alpha + cos^2\alpha = 1; \qquad \begin{cases} sen\ \alpha = \pm\sqrt{1-cos^2\alpha} \\ cos\ \alpha = \pm\sqrt{1-sen^2\alpha} \end{cases}; \qquad tg\ \alpha = \frac{sen\ \alpha}{cos\ \alpha}; \qquad cotg\ \alpha = \frac{cos\ \alpha}{sen\ \alpha};$$

$$sec\ \alpha = \frac{1}{cos\ \alpha}; \qquad cosec\ \alpha = \frac{1}{sen\ \alpha}; \qquad sen\ \alpha = \pm\frac{tg\ \alpha}{\sqrt{1+tg^2\alpha}}; \qquad cos\ \alpha = \pm\frac{1}{\sqrt{1+tg^2\alpha}}.$$

Funzioni di archi notevoli

Funzioni/angoli	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
seno	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	0	-1	0
coseno	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	-1	0	1
tangente	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	$\pm\infty$	0	$\pm\infty$	0
cotangente	$\pm\infty$	$\sqrt{3}$	1	$\frac{\sqrt{3}}{3}$	0	$\pm\infty$	0	$\pm\infty$

Archi associati

Archi complemetari:

$$sen\alpha = cos\left(\frac{\pi}{2}-\alpha\right); \qquad cos\alpha = sen\left(\frac{\pi}{2}-\alpha\right); \qquad tg\alpha = cotg\left(\frac{\pi}{2}-\alpha\right); \qquad cotg\alpha = tg\left(\frac{\pi}{2}-\alpha\right).$$

Archi che differiscono di $\frac{\pi}{2}$*:*

$$sen\alpha = -cos\left(\frac{\pi}{2}+\alpha\right); \quad cos\alpha = sen\left(\frac{\pi}{2}+\alpha\right); \quad tg\alpha = -cotg\left(\frac{\pi}{2}+\alpha\right); \quad cotg\alpha = -tg\left(\frac{\pi}{2}+\alpha\right).$$

Archi supplementari:

$$sen\ \alpha = sen(\pi-\alpha); \qquad cos\ \alpha = -cos(\pi-\alpha); \qquad tg\ \alpha = -tg(\pi-\alpha); \qquad cotg\ \alpha = -cotg(\pi-\alpha).$$

Archi che differiscono di π*:*

$$sen\ \alpha = -sen(\pi+\alpha); \qquad cos\ \alpha = -cos(\pi+\alpha); \qquad tg\ \alpha = tg(\pi+\alpha); \qquad cotg\ \alpha = cotg(\pi+\alpha).$$

Archi opposti:

$$sen\ \alpha = -sen(-\alpha); \qquad cos\ \alpha = cos(-\alpha); \qquad tg\ \alpha = -tg(-\alpha); \qquad cotg\ \alpha = -cotg(-\alpha).$$

Formule di addizione e sottrazione

$$sen(\alpha\pm\beta) = sen\alpha cos\beta \pm cos\alpha sen\beta; \quad cos(\alpha\pm\beta) = cos\alpha cos\beta \mp sen\alpha sen\beta; \quad tg(\alpha\pm\beta) = \frac{tg\ \alpha \pm tg\ \beta}{1 \mp tg\ \alpha tg\ \beta}.$$

[1] Realizzato in LaTeX da Valerio Lacagnina, Nov 2000

Formule di duplicazione

$$sen\,2\alpha = 2sen\,\alpha\,cos\,\beta; \quad cos\,2\alpha = cos^2\alpha - sen^2\alpha = 2cos^2\alpha - 1 = 1 - 2sen^2\alpha; \quad tg\,2\alpha = \frac{2tg\,\alpha}{1 - tg^2\alpha}.$$

Formule parametriche

$$sen\,\alpha = \frac{2tg\frac{\alpha}{2}}{1 + tg^2\frac{\alpha}{2}}; \quad cos\,\alpha = \frac{1 - tg^2\frac{\alpha}{2}}{1 + tg^2\frac{\alpha}{2}}; \quad tg\,\alpha = \frac{2tg\frac{\alpha}{2}}{1 + tg^2\frac{\alpha}{2}}.$$

Formule di bisezione

$$sen\,\frac{\alpha}{2} = \pm\sqrt{\frac{1 - cos\,\alpha}{2}}; \quad cos\,\frac{\alpha}{2} = \pm\sqrt{\frac{1 + cos\,\alpha}{2}}; \quad tg\,\frac{\alpha}{2} = \pm\sqrt{\frac{1 - cos\,\alpha}{1 + cos\,\alpha}} = \frac{sen\,\alpha}{1 + cos\,\alpha} = \frac{1 - cos\,\alpha}{sen\,\alpha}.$$

Formule di prostaferesi

$$sen\,\alpha + sen\,\beta = 2\,sen\,\frac{\alpha+\beta}{2}\,cos\,\frac{\alpha-\beta}{2}; \qquad sen\,\alpha - sen\,\beta = 2\,sen\,\frac{\alpha-\beta}{2}\,cos\,\frac{\alpha+\beta}{2};$$

$$cos\,\alpha + cos\,\beta = 2\,cos\,\frac{\alpha+\beta}{2}\,cos\,\frac{\alpha-\beta}{2}; \qquad cos\,\alpha - cos\,\beta = -2\,sen\,\frac{\alpha+\beta}{2}\,sen\,\frac{\alpha-\beta}{2}.$$

Formule di Werner

$$sen\,\alpha\,sen\,\beta = \frac{1}{2}\,(cos(\alpha-\beta) - cos(\alpha+\beta)); \qquad cos\,\alpha\,cos\,\beta = \frac{1}{2}\,(cos(\alpha+\beta) + cos(\alpha-\beta));$$

$$sen\,\alpha\,cos\,\beta = \frac{1}{2}\,(sen(\alpha+\beta) + sen(\alpha-\beta)); \qquad cos\,\alpha\,sen\,\beta = \frac{1}{2}\,(sen(\alpha+\beta) - sen(\alpha-\beta)).$$