FORMULE TRIGONOMETRICHE DI BASE

- $\operatorname{sen}^2 + \cos^2 = 1$

ARCHI ASSOCIATI

- $\operatorname{sen}\left(\frac{\pi}{2} - \alpha\right) = \cos\alpha$ $\quad$ - $\cos\left(\frac{\pi}{2} - \alpha\right) = \operatorname{sen}\alpha$
- $\operatorname{sen}\left(\frac{\pi}{2} + \alpha\right) = \cos\alpha$ $\quad$ - $\cos\left(\frac{\pi}{2} + \alpha\right) = -\operatorname{sen}\alpha$
- $\operatorname{sen}\left(\pi - \alpha\right) = \operatorname{sen}\alpha$ $\quad$ - $\cos\left(\pi - \alpha\right) = -\cos\alpha$
- $\operatorname{sen}\left(\pi + \alpha\right) = -\operatorname{sen}\alpha$ $\quad$ - $\cos\left(\pi + \alpha\right) = -\cos\alpha$
- $\operatorname{sen}\left(\frac{3}{2}\pi - \alpha\right) = -\cos\alpha$ $\quad$ - $\cos\left(\frac{3}{2}\pi - \alpha\right) = -\operatorname{sen}\alpha$
- $\operatorname{sen}\left(\frac{3}{2}\pi + \alpha\right) = -\cos\alpha$ $\quad$ - $\cos\left(\frac{3}{2}\pi + \alpha\right) = \operatorname{sen}\alpha$
- $\operatorname{sen}\left(-\alpha\right) = -\operatorname{sen}\alpha$ $\quad$ - $\cos\left(-\alpha\right) = \cos\alpha$

SOMMAZIONE PER ARCHI

$$\operatorname{sen}(\alpha+\beta) = \operatorname{sen}\alpha\cos\beta + \cos\alpha\operatorname{sen}\beta$$

$$\operatorname{sen}(\alpha-\beta) = \operatorname{sen}\alpha\cos\beta - \cos\alpha\operatorname{sen}\beta$$

$$\cos(\alpha+\beta) = \cos\alpha\cos\beta - \operatorname{sen}\alpha\operatorname{sen}\beta$$

$$\cos(\alpha-\beta) = \cos\alpha\cos\beta + \operatorname{sen}\alpha\operatorname{sen}\beta$$

con $k \in \mathbb{Z}$

$$\tan(\alpha+\beta) = \frac{\tan(\alpha) + \tan(\beta)}{1 - \tan(\alpha)\tan(\beta)}$$

con $\alpha, \beta, \alpha+\beta \neq \pi/2 + k\pi$

$$\tan(\alpha-\beta) = \frac{\tan(\alpha) - \tan(\beta)}{1 + \tan(\alpha)\tan(\beta)}$$

con $\alpha, \beta, \alpha-\beta \neq \pi/2 + k\pi$

FORMULE DUPLICAZIONE

$t = \tan\left(\frac{\alpha}{2}\right)$

$$\operatorname{sen}(\alpha) = \frac{2t}{1+t^2} \quad , \alpha \neq \pi + 2k\pi$$

$$\cos(\alpha) = \frac{1-t^2}{1+t^2} \quad , \alpha \neq \pi + 2k\pi$$

$$\tan(\alpha) = \frac{2t}{1-t^2} \quad , \alpha \neq \frac{\pi}{2} + k\pi \quad e \quad \alpha \neq \pi + 2k\pi$$

FORMULE BISEZIONE

$$\operatorname{sen}\left(\frac{\alpha}{2}\right) = \pm\sqrt{\frac{1-\cos(\alpha)}{2}}$$

$$\cos\left(\frac{\alpha}{2}\right) = \pm\sqrt{\frac{1+\cos(\alpha)}{2}}$$

$$\tan\left(\frac{\alpha}{2}\right) = \pm\sqrt{\frac{1-\cos(\alpha)}{1+\cos(\alpha)}} \quad , \alpha \neq \pi + 2k\pi$$

WERNER

$$\operatorname{sen}\alpha \operatorname{sen}\beta = \frac{1}{2}\left[\cos(\alpha-\beta) - \cos(\alpha+\beta)\right]$$

$$\cos\alpha \cos\beta = \frac{1}{2}\left[\cos(\alpha-\beta) + \cos(\alpha+\beta)\right]$$

$$\operatorname{sen}\alpha \cos\beta = \frac{1}{2}\left[\operatorname{sen}(\alpha-\beta) + \operatorname{sen}(\alpha+\beta)\right]$$

PROSTAFERESI

$$\operatorname{sen}\alpha + \operatorname{sen}\beta = 2\operatorname{sen}\left(\frac{\alpha+\beta}{2}\right)\cos\left(\frac{\alpha-\beta}{2}\right)$$

$$\cos\alpha + \cos\beta = 2\cos\left(\frac{\alpha+\beta}{2}\right)\cos\left(\frac{\alpha-\beta}{2}\right)$$

$$\operatorname{sen}\alpha - \operatorname{sen}\beta = 2\cos\left(\frac{\alpha+\beta}{2}\right)\operatorname{sen}\left(\frac{\alpha-\beta}{2}\right)$$

$$\cos\alpha - \cos\beta = -2\operatorname{sen}\left(\frac{\alpha+\beta}{2}\right)\cos\left(\frac{\alpha-\beta}{2}\right)$$