

RELAZIONI GONIOMETRICHE

Relazioni fondamentali

$\text{sen}^2 \alpha + \text{cos}^2 \alpha = 1$	$\text{tg } \alpha = \frac{\text{sen } \alpha}{\text{cos } \alpha}$	$\text{cotg } \alpha = \frac{\text{cos } \alpha}{\text{sen } \alpha}$	$\text{sec } \alpha = \frac{1}{\text{cos } \alpha}$	$\text{cosec } \alpha = \frac{1}{\text{sen } \alpha}$
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Relazioni tra le funzioni goniometriche

	$\text{sen } \alpha$	$\text{cos } \alpha$	$\text{tg } \alpha$	$\text{cotg } \alpha$
$\text{sen } \alpha$	$\text{sen } \alpha$	$\pm \sqrt{1 - \text{cos}^2 \alpha}$	$\pm \frac{\text{tg } \alpha}{\sqrt{1 + \text{tg}^2 \alpha}}$	$\pm \frac{1}{\sqrt{1 + \text{cotg}^2 \alpha}}$
$\text{cos } \alpha$	$\pm \sqrt{1 - \text{sen}^2 \alpha}$	$\text{cos } \alpha$	$\pm \frac{1}{\sqrt{1 + \text{tg}^2 \alpha}}$	$\pm \frac{\text{cotg } \alpha}{\sqrt{1 + \text{cotg}^2 \alpha}}$
$\text{tg } \alpha$	$\pm \frac{\text{sen } \alpha}{\sqrt{1 - \text{sen}^2 \alpha}}$	$\pm \frac{\sqrt{1 - \text{cos}^2 \alpha}}{\text{cos } \alpha}$	$\text{tg } \alpha$	$\frac{1}{\text{cotg } \alpha}$
$\text{cotg } \alpha$	$\pm \frac{\sqrt{1 - \text{sen}^2 \alpha}}{\text{sen } \alpha}$	$\pm \frac{\text{cos } \alpha}{\sqrt{1 - \text{cos}^2 \alpha}}$	$\frac{1}{\text{tg } \alpha}$	$\text{cotg } \alpha$

Archi Associati

Archi Supplementari	Archi che differiscono di π	Archi opposti	Archi esplementari
$\text{sen}(\pi - x) = \text{sen } x$	$\text{sen}(\pi + x) = -\text{sen } x$	$\text{sen}(-x) = -\text{sen } x$	$\text{sen}(2\pi - x) = -\text{sen } x$
$\text{cos}(\pi - x) = -\text{cos } x$	$\text{cos}(\pi + x) = -\text{cos } x$	$\text{cos}(-x) = \text{cos } x$	$\text{cos}(2\pi - x) = \text{cos } x$
$\text{tg}(\pi - x) = -\text{tg } x$	$\text{tg}(\pi + x) = \text{tg } x$	$\text{tg}(-x) = -\text{tg } x$	$\text{tg}(2\pi - x) = -\text{tg } x$
$\text{cotg}(\pi - x) = -\text{cotg } x$	$\text{cotg}(\pi + x) = \text{cotg } x$	$\text{cotg}(-x) = -\text{cotg } x$	$\text{cotg}(2\pi - x) = -\text{cotg } x$
Archi complementari	Archi che differiscono di $\pi/2$	Archi la cui somma è $3\pi/2$	Archi che differiscono di $3\pi/2$
$\text{sen}(\pi/2 - x) = \text{cos } x$	$\text{sen}(\pi/2 + x) = \text{cos } x$	$\text{sen}(3\pi/2 - x) = -\text{cos } x$	$\text{sen}(3\pi/2 + x) = -\text{cos } x$
$\text{cos}(\pi/2 - x) = \text{sen } x$	$\text{cos}(\pi/2 + x) = -\text{sen } x$	$\text{cos}(3\pi/2 - x) = -\text{sen } x$	$\text{cos}(3\pi/2 + x) = \text{sen } x$
$\text{tg}(\pi/2 - x) = \text{cotg } x$	$\text{tg}(\pi/2 + x) = -\text{cotg } x$	$\text{tg}(3\pi/2 - x) = \text{cotg } x$	$\text{tg}(3\pi/2 + x) = -\text{cotg } x$
$\text{cotg}(\pi/2 - x) = \text{tg } x$	$\text{cotg}(\pi/2 + x) = -\text{tg } x$	$\text{cotg}(3\pi/2 - x) = \text{tg } x$	$\text{cotg}(3\pi/2 + x) = -\text{tg } x$

Formule di Addizione e Sottrazione

$\text{sen}(a \pm b) = \text{sen } a \cdot \text{cos } b \pm \text{cos } a \cdot \text{sen } b$	$\text{cos}(a \pm b) = \text{cos } a \cdot \text{cos } b \mp \text{sen } a \cdot \text{sen } b$
$\text{tg}(a \pm b) = \frac{\text{tg } a \pm \text{tg } b}{1 \mp \text{tg } a \cdot \text{tg } b}$	$\text{cotg}(a \pm b) = \frac{\text{cotg } b \cdot \text{cotg } a \mp 1}{\text{cotg } b \pm \text{cotg } a}$

Formule di Duplicazione

$\text{sen}(2a) = 2 \text{sen } a \cdot \text{cos } a$	$\text{cos}(2a) = \text{cos}^2 a - \text{sen}^2 a = 1 - 2 \text{sen}^2 a = 2 \text{cos}^2 a - 1$
$\text{tg}(2a) = \frac{2 \text{tg } a}{1 - \text{tg}^2 a}$	$\text{cotg}(2a) = \frac{\text{cotg}^2 a - 1}{2 \text{cotg } a}$

Formule di Bisezione

$\text{sen}\left(\frac{\alpha}{2}\right) = \pm \sqrt{\frac{1 - \text{cos } \alpha}{2}}$	$\text{tg}\left(\frac{\alpha}{2}\right) = \pm \sqrt{\frac{1 - \text{cos } \alpha}{1 + \text{cos } \alpha}} = \frac{1 - \text{cos } \alpha}{\text{sen } \alpha} = \frac{\text{sen } \alpha}{1 + \text{cos } \alpha}$
$\text{cos}\left(\frac{\alpha}{2}\right) = \pm \sqrt{\frac{1 + \text{cos } \alpha}{2}}$	$\text{cotg}\left(\frac{\alpha}{2}\right) = \pm \sqrt{\frac{1 + \text{cos } \alpha}{1 - \text{cos } \alpha}} = \frac{1 + \text{cos } \alpha}{\text{sen } \alpha} = \frac{\text{sen } \alpha}{1 - \text{cos } \alpha}$

Formule di Prostaferesi

$\text{sen } p + \text{sen } q = 2 \text{sen}\left(\frac{p+q}{2}\right) \text{cos}\left(\frac{p-q}{2}\right)$	$\text{cos } p + \text{cos } q = 2 \text{cos}\left(\frac{p+q}{2}\right) \text{cos}\left(\frac{p-q}{2}\right)$
$\text{sen } p - \text{sen } q = 2 \text{sen}\left(\frac{p-q}{2}\right) \text{cos}\left(\frac{p+q}{2}\right)$	$\text{cos } p - \text{cos } q = -2 \text{sen}\left(\frac{p+q}{2}\right) \text{sen}\left(\frac{p-q}{2}\right)$

Formule di Werner

$\text{sen } a \cdot \text{cos } b = \frac{1}{2} [\text{sen}(a+b) + \text{sen}(a-b)]$	$\text{sen } a \cdot \text{sen } b = \frac{1}{2} [\text{cos}(a-b) - \text{cos}(a+b)]$
$\text{cos } a \cdot \text{cos } b = \frac{1}{2} [\text{cos}(a+b) + \text{cos}(a-b)]$	

Formule Parametriche (con $t = \text{tg}\left(\frac{\alpha}{2}\right)$)

$\text{sen } \alpha = \frac{2t}{1+t^2}$	$\text{cos } \alpha = \frac{1-t^2}{1+t^2}$	$\text{tg } \alpha = \frac{2t}{1-t^2}$	$\text{cotg } \alpha = \frac{1-t^2}{2t}$
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