LEZIONI

LE FORMULE DELLA GONIOMETRIA

Abbiamo qui raccolto le formule che permettono di calcolare le funzioni di un angolo conoscendo quelle di uno o più angoli legati al primo da una certa relazione

FORMULE DI ADDIZIONE E DI SOTTRAZIONE

1. $sen(\alpha \pm \beta) = sen\alpha \cos\beta \pm \cos\alpha sen\beta$

2. $\cos(\alpha \pm \beta) = \cos\alpha \cos\beta \mp sen\alpha sen\beta$

3. $tg(\alpha \pm \beta) = \dfrac{tg\alpha \pm tg\beta}{1 \mp tg\alpha \cdot tg\beta}$ $\qquad \alpha, \beta \neq \dfrac{\pi}{2} + k\pi$ $\quad$ e $\quad$ $\alpha \pm \beta \neq \dfrac{\pi}{2} + k\pi$

4. $ctg(\alpha \pm \beta) = \dfrac{1 \mp tg\alpha \cdot tg\beta}{tg\alpha \pm tg\beta} = \dfrac{ctg\alpha \cdot ctg\beta \mp 1}{ctg\beta \pm ctg\alpha}$ $\qquad \alpha, \beta \neq k\pi$ $\quad$ e $\quad$ $\alpha \pm \beta \neq k\pi$

FORMULE DI DUPLICAZIONE

5. $sen\,2\alpha = 2sen\alpha\cos\alpha$

6. $\cos 2\alpha = \cos^2\alpha - sen^2\alpha = 1 - 2sen^2\alpha = 2\cos^2\alpha - 1$

7. $tg\,2\alpha = \dfrac{2tg\alpha}{1 - tg^2\alpha}$ $\qquad \alpha \neq \dfrac{\pi}{2} + k\pi$ $\quad$ e $\quad$ $\alpha \neq \dfrac{\pi}{4} + k\dfrac{\pi}{2}$

8. $ctg\,2\alpha = \dfrac{1 - tg^2\alpha}{2tg\alpha} = \dfrac{ctg^2\alpha - 1}{2ctg\alpha}$ $\qquad \alpha \neq k\dfrac{\pi}{2}$

FORMULE PARAMETRICHE

9. $sen\alpha = \dfrac{2t}{1+t^2}$ $\quad$ e $\quad$ $\cos\alpha = \dfrac{1-t^2}{1+t^2}$ $\qquad$ con $\quad t = tg\dfrac{\alpha}{2}$ $\quad (\alpha \neq \pi + 2k\pi)$

FORMULE DI BISEZIONE

10. $sen\dfrac{\alpha}{2} = \pm\sqrt{\dfrac{1-\cos\alpha}{2}}$

11. $\cos\frac{\alpha}{2} = \pm\sqrt{\frac{1+\cos\alpha}{2}}$

12. $tg\frac{\alpha}{2} = \pm\sqrt{\frac{1-\cos\alpha}{1+\cos\alpha}}$ o $tg\frac{\alpha}{2} = \pm\frac{sen\alpha}{1+\cos\alpha}$ o $tg\frac{\alpha}{2} = \pm\frac{1-\cos\alpha}{sen\alpha}$ $\alpha \neq \pi + 2k\pi$

13. $ctg\frac{\alpha}{2} = \pm\sqrt{\frac{1+\cos\alpha}{1-\cos\alpha}}$ $\alpha \neq 2k\pi$

FORMULE DI PROSTAFERESI

14. $sen\ p + sen\ q = 2sen\frac{p+q}{2}\cos\frac{p-q}{2}$

15. $sen\ p - senq = 2\cos\frac{p+q}{2}sen\frac{p-q}{2}$

16. $\cos p + \cos q = 2\cos\frac{p+q}{2}\cos\frac{p-q}{2}$

17. $\cos p - \cos q = -2sen\frac{p+q}{2}sen\frac{p-q}{2}$

18. $tg\ p \pm tg\ q = \frac{sen(p \pm q)}{\cos p \cos q}$ $p, q \neq \frac{\pi}{2} + k\pi$

19. $ctg\ p \pm ctg\ q = \frac{sen(p \pm q)}{sen\ p\ sen\ q}$ $p, q \neq k\pi$

FORMULE DI WERNER

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

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

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