

# TRANSFORMAÇÕES TRIGONOMÉTRICAS

## 1) Seno da Soma

$$\hookrightarrow \sin(a+b) = \sin(a)\cos(b) + \cos(a)\sin(b)$$

## 2) Seno da Diferença

$$\hookrightarrow \sin(a-b) = \sin(a)\cos(b) - \cos(a)\sin(b)$$

## 3) Cosseno da Soma

$$\hookrightarrow \cos(a+b) = \cos(a)\cos(b) - \sin(a)\sin(b)$$

## 4) Cosseno da Diferença

$$\hookrightarrow \cos(a-b) = \cos(a)\cos(b) + \sin(a)\sin(b)$$

## NOTE QUE

### 1) Somando 1 com 2 temos:

$$\sin(\underbrace{a+b}_p) + \sin(\underbrace{a-b}_q) = 2\sin(a)\cos(b)$$

$$\begin{cases} a+b=p \\ a-b=q \end{cases}$$

ENTÃO

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

$$a = \frac{p+q}{2} \quad b = \frac{p-q}{2}$$

## 2) Subtraindo 2 de 1 temos:

$$\operatorname{sen}(a+b) - \operatorname{sen}(a-b) = 2 \operatorname{sen}(b) \cos(a)$$

ENTÃO

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

## 3) Somando 3 e 4 temos:

$$\cos(a+b) + \cos(a-b) = 2 \cos(a) \cos(b)$$

ENTÃO:

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

## 4) Subtraindo 4 de 3 temos:

$$\cos(a+b) - \cos(a-b) = -2 \operatorname{sen}(a) \operatorname{sen}(b)$$

ENTÃO:

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