

## Fórmulas matemáticas básicas

### 1 Razones trigonométricas

#### 1.1 Suma de ángulos

$$\text{sen}(a + b) = \text{sen}(a)\cos(b) + \text{sen}(b)\cos(a)$$

$$\text{sen}(a - b) = \text{sen}(a)\cos(b) - \text{sen}(b)\cos(a)$$

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

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

#### 1.2 Ángulo doble

$$\text{sen}(2a) = 2\text{sen}(a)\cos(a)$$

$$\cos(2a) = \cos^2(a) - \text{sen}^2(a)$$

#### 1.3 Ángulo mitad

$$\cos\left(\frac{a}{2}\right) = \sqrt{\frac{1 + \cos(a)}{2}}; \quad \text{sen}\left(\frac{a}{2}\right) = \sqrt{\frac{1 - \cos(a)}{2}}$$

### 2 Sumas y productos

$$\text{sen}(a) + \text{sen}(b) = 2\text{sen}\left(\frac{a+b}{2}\right)\cos\left(\frac{a-b}{2}\right); \quad \text{sen}(a) - \text{sen}(b) = 2\text{sen}\left(\frac{a-b}{2}\right)\cos\left(\frac{a+b}{2}\right)$$

$$\cos(a) + \cos(b) = 2\cos\left(\frac{a+b}{2}\right)\cos\left(\frac{a-b}{2}\right); \quad \cos(a) - \cos(b) = -2\text{sen}\left(\frac{a+b}{2}\right)\text{sen}\left(\frac{a-b}{2}\right)$$

### 3 Euler

$$\cos(\omega) = \frac{e^{j\omega} + e^{-j\omega}}{2}; \quad \text{sen}(\omega) = \frac{e^{j\omega} - e^{-j\omega}}{2j}$$

$$e^{j\omega} = \cos(\omega) + j\text{sen}(\omega); \quad e^{-j\omega} = \cos(\omega) - j\text{sen}(\omega)$$

### 4 Suma de una progresión geométrica

$$\sum_{n=0}^{\infty} a_0 r^n = \frac{a_0}{1-r} \quad \text{si } |r| < 1$$

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