Converting sums into products

Sometimes it is useful to convert the sum of sines or cosines into products, to solve the equations that we will introduce later. We will be able to do this by using these formulas:

$$\sin A + \sin B = 2 \cdot \sin\left(\frac{A+B}{2}\right) \cdot \cos\left(\frac{A-B}{2}\right)$$

$$\sin A - \sin B = 2 \cdot \cos\left(\frac{A+B}{2}\right) \cdot \sin\left(\frac{A-B}{2}\right)$$

$$\cos A + \cos B = 2 \cdot \cos\left(\frac{A+B}{2}\right) \cdot \cos\left(\frac{A-B}{2}\right)$$

$$\cos A + \cos B = -2 \cdot \sin\left(\frac{A+B}{2}\right) \cdot \sin\left(\frac{A-B}{2}\right)$$

Converting products into sums

Now we present the identities that allow us to convert the product of trigonometric ratios into sums:

$$\sin A \cdot \cos B = \frac{1}{2}\Big(\sin(A+B) + \sin(A-B)\Big)$$

$$\cos A \cdot \cos B = \frac{1}{2}\Big(\cos(A+B) + \cos(A-B)\Big)$$

$$\sin A \cdot \sin B = -\frac{1}{2}\Big(\cos(A+B) - \cos(A-B)\Big)$$