Transformation Formulae

1. Product to Sum

$$2\sin(A)\cos(B) = \sin(A+B) + \sin(A-B)$$

$$2\cos(A)\sin(B) = \sin(A+B) - \sin(A-B)$$

$$2\cos(A)\cos(B) = \cos(A+B) + \cos(A-B)$$

$$2\sin(A)\sin(B) = \cos(A+B) - \cos(A-B)$$

2. Sum to Product

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

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

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

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