

Some basic math relations to know:

$$\cos z = \frac{1}{2}(e^{iz} + e^{-iz}), \quad \sin z = \frac{1}{2i}(e^{iz} - e^{-iz})$$

$$e^{iz} = \cos z + i \sin z$$

$$z + z^* = 2 \operatorname{Re}(z)$$

$$z - z^* = 2 \operatorname{Im}(z)$$

Expansion:

$$f(x)|_{x_0} \approx f(x_0) + (x - x_0)f'(x_0) + \frac{1}{2!}(x - x_0)^2 f''(x_0) + \dots$$

Common examples, $\varepsilon \ll 1$

$$(1 + \varepsilon)^n \approx 1 + n\varepsilon$$

$$\sin \varepsilon \approx \varepsilon + \dots$$

$$\cos \varepsilon \approx 1 - \frac{1}{2}\varepsilon^2 + \dots$$

$$\exp \varepsilon \approx 1 + \varepsilon + \dots$$