

Wave Equation

Progressive Plane Wave

$$s = s_o \sin\left[2\pi\left(\frac{t}{T} \pm \frac{x}{\lambda}\right) + \alpha\right]$$

Standing Wave Equation

$$s = A \cos\left(2\pi\frac{x}{\lambda} + \frac{\phi}{2}\right) \sin\left(2\pi\frac{t}{T} + \frac{\phi}{2}\right)$$

where ϕ is the phase shift at origo. Node distance is $\frac{\lambda}{2}$

The General Wave Equation

$$\frac{\partial^2 s}{\partial t^2} = v^2 \frac{\partial^2 s}{\partial x^2}$$

Oscillation Frequency

$$f_{\text{oscillation}} = |f_1 - f_2|$$