EQUATION OF WAVE MOTION

In wave motion, the basic equation describes how a disturbance travels through space and time.

General equation of a progressive wave

For a wave moving in the +x direction.

$$y(x,t) = A \sin(kx - \omega t + \phi)$$

(or cosine form is equally valid)

Meaning of each term →

$y(x,t)$ → displacement at position x and time t

A → Amplitude (maximum displacement)

$K = \frac{2\pi}{\lambda}$ → wave number

λ = wavelength

$\omega = 2\pi f$ → Angular frequency

f → Frequency

ϕ → Phase constant

Wave moving in the opposite direction

For motion in the $-x$ direction

$$y(x,t) = A \sin(kx + \omega t + \phi)$$

Wave equation (Differential form)

The general wave equation is:

$$\frac{\partial^2 y}{\partial x^2} = \frac{1}{v^2} \frac{\partial^2 y}{\partial t^2}$$

where v is the wave speed.

If you want, tell me:

~~Is this for physics~~ ✓