

Wave formulae

Wave equation	$y(x,t) = A \sin(\omega t \pm k x + \varphi_0), \quad k = 2\pi/\lambda$ <p>Where: $T = \frac{1}{f}, \quad \omega = 2\pi f, \quad \omega = \frac{2\pi}{T}, \quad k = \frac{2\pi}{\lambda}$</p>
Vibration speed of material particles	$V_v(x,t) = A \omega \cos(\omega t \pm k x + \varphi_0)$ $V_{v,MAX} = \pm A \omega$
Phase offset or phase difference	$\Delta\varphi = k \Delta x, \quad \Delta\varphi = \omega \Delta t$
Wave velocity or phase velocity	$v = \lambda f, \quad v = \frac{\lambda}{T}, \quad v = \frac{\omega}{k}$

Symbol	Magnitude	S.I. unit
y	Wave state	(m)
x	x coordinate	m
t	Time	s
A	Amplitude	(m)
ω	Angular frequency or pulsatance	rad/s
k	Wavenumber	rad/m
φ_0	Phase or initial angle	rad
$\Delta\varphi$	Phase offset or phase difference	rad
Δx	Change of distance	m
Δt	Change of time	s
T	Period	s
v	Wave velocity or phase velocity	m/s
V_v	Vibration speed of material particles	(m)/s
λ	Wavelength	m
f	Wave frequency	Hz