Question#8468

What are the fundamental measures of a wave and how do they relate to each other?

Answer:

The fundamental measures of a wave are:

The is ***period*** $\boldsymbol{T}$ the time for one complete cycle of an oscillation of a wave.

The ***frequency*** $\boldsymbol{f}$ is the number of periods per unit time (per second) and is typically measured in hertz. These are related by:

$$f = \frac{1}{T}$$

The ***angular frequency*** $\boldsymbol{\omega}$ represents the frequency in radians per second. It is related to the frequency or period by

$$\omega = 2\pi f = \frac{2\pi}{T}$$

The ***wavelength*** λ of a sinusoidal waveform traveling at constant speed $\boldsymbol{v}$ is given by:

$$\lambda = \frac{v}{f}$$

where $\boldsymbol{v}$ is called the phase ***speed of the wave*** and $\boldsymbol{f}$ is the wave's frequency.

Amplitude of the wave - maximum distance from the highest point of the disturbance in the medium (the crest) to the equilibrium point during one wave cycle.