Phys 2426 2017-11-07 Lec 19

Oscillations Review $x = x_{max} \sin(2\pi f t)$

Amplitude, frequency, or cosine

Speed of oscillating object: $v = x_{max} 2\pi f \cos(2\pi f t)$

$= v_{max} \cos(2\pi f t)$

Angular frequency: $\omega = 2\pi f$ in radians/s $= s^{-1}$

Period (T): Time of one cycle

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

Ex: $f = \frac{1}{2\pi}\sqrt{\frac{k}{m}}$

Pendulum $f = \frac{1}{2\pi}\sqrt{\frac{g}{L}}$

Waves Many coupled oscillators.

Disturbance and Energy propagate "forward".

Oscillators or Medium vibrates in place.

Oscillation in time causes a sine shape in a photo of the wave.

Wavelength (λ) is length of one oscillation.

Speed of a Wave

$$v = \frac{ds}{dt} = \frac{\text{Dist}}{\text{Time}} = \frac{\lambda}{T}$$

$$f = \frac{1}{T} \Rightarrow v = f\lambda$$

String Wave - Oscillations are sideways
= Transverse Wave or Shear Wave

Sound Wave - Oscillations are fwd/bkwd
= Longitudinal or Compression Wave

Dan Russell Waves

EM Waves - Electric and Magnetic Fields
Each is transverse and $\vec{E} \perp \vec{B}$