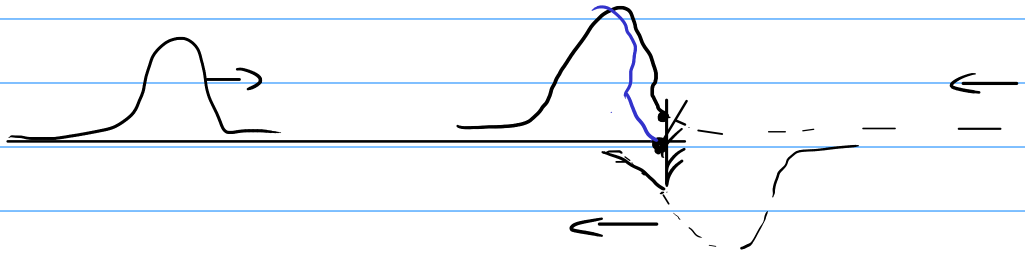
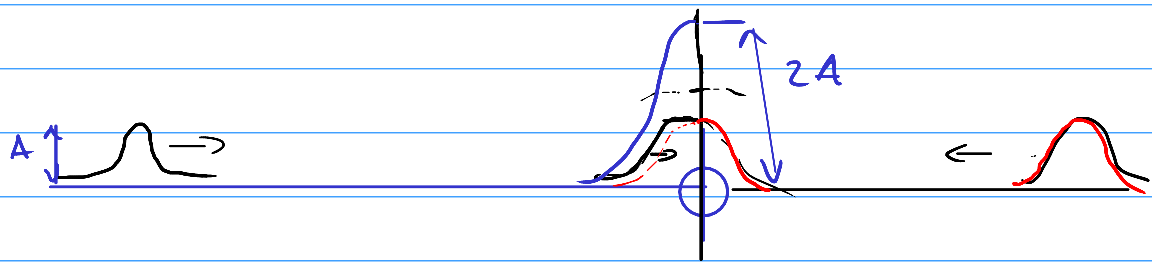
$$y(x,t) = y(x \mp vt)$$

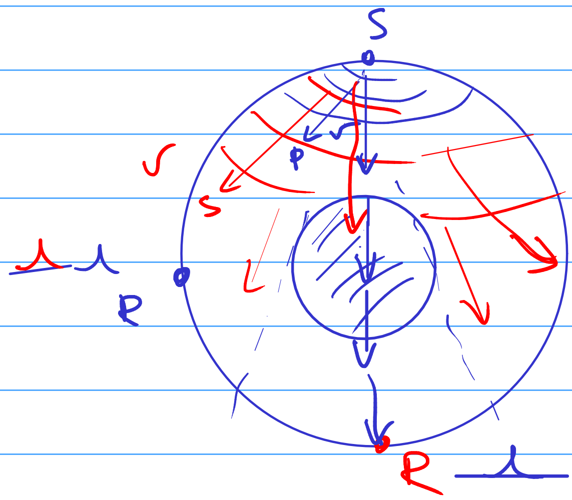
$$\frac{\partial^2}{\partial x^2} y(x,t) = \frac{1}{v^2} \frac{\partial^2}{\partial t^2} y(x,t)$$

$$v = \sqrt{\frac{F_T}{\mu}} \qquad \mu \approx \frac{\Delta m}{\Delta l}$$

$$y(x,t) = y_1(x - vt) + y_2(x + vt - x_0)$$

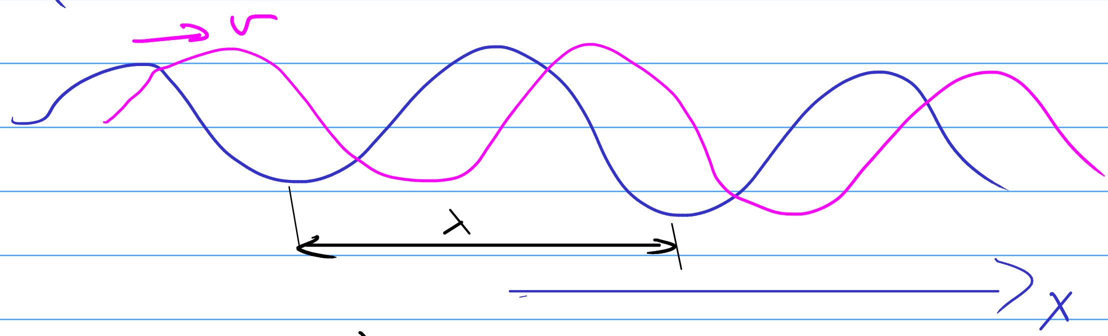






$$y(x - vt)$$

$$y = \cos(kx - \omega t) = \cos(k(\overbrace{x - vt}^{u}))$$



$$2\pi + kx = k(x+\lambda) \Rightarrow 2\pi = k\lambda \Rightarrow \boxed{k = \frac{2\pi}{\lambda}}$$

wave vector

$$\underbrace{kv}t = \underbrace{\omega}t \qquad \boxed{\begin{array}{l} \omega = kv = \dfrac{2\pi v}{\lambda} \\ f = \frac{\omega}{2\pi} = \frac{v}{\lambda} \end{array}}$$

Standing waves

$$A\cos(\overrightarrow{kx - \omega t}) + A\cos(\overleftarrow{kx + \omega t}) =$$

$$= 2A\cos\left(\frac{kx - \omega t + kx + \omega t}{2}\right) \cdot \cos\left(\frac{kx - \omega t - kx - \omega t}{2}\right)$$

$$= 2A\cos(kx) \cdot \cos(-\omega t) = 2A\cos(kx)\cos(\omega t)$$