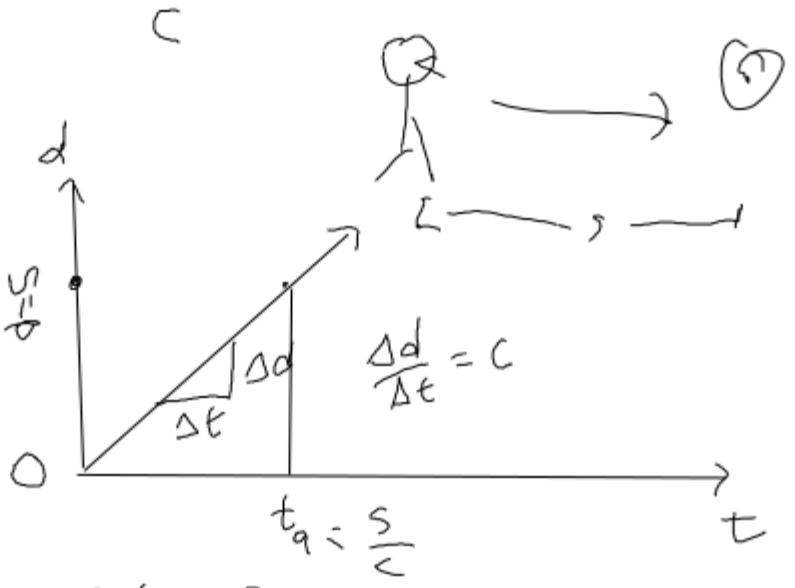
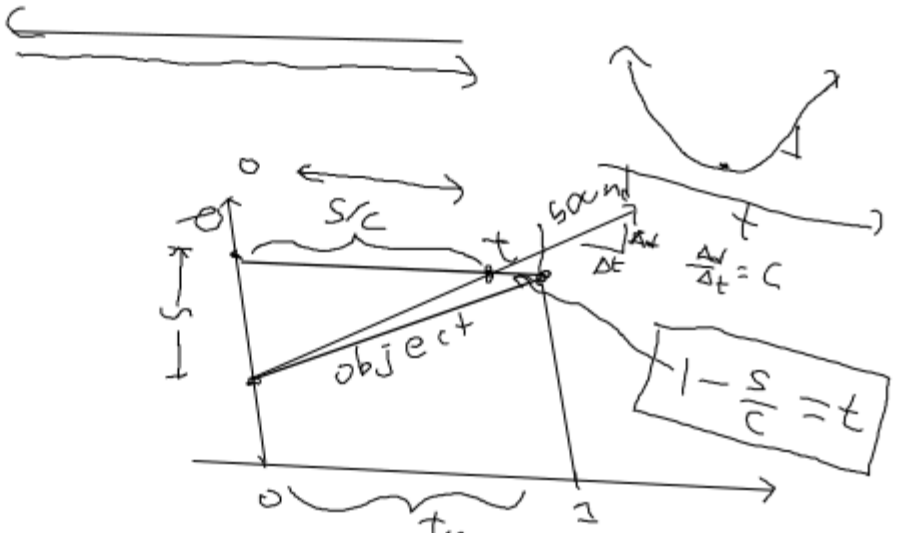


$\Delta\phi = \frac{s}{c} \cdot f$ cycles $= 2\pi \frac{s}{c} f$ radians



$\frac{f}{f_0} = \frac{1}{\left(\frac{t}{t_0}\right)} = \frac{1}{1 - s/c}$

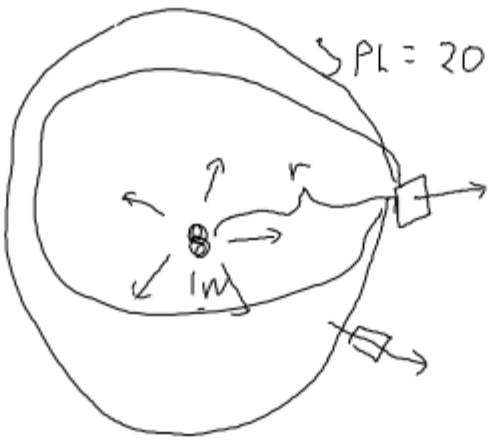
Doppler Shift

effective sound pressure

$RMS(p(t))$

sound pressure level (SPL)

$20 \log_{10}\left(\frac{RMS(p(t))}{p_0}\right)$



$SPL = 20 \log_{10}\left(\frac{p}{p_0}\right)$

Intensity = power / area

$4\pi r^2$

intensity $= \frac{1W}{4\pi r^2} = I$