# Waves I - 1

**Transverse, travelling waves (2), (3):**

$$y(x,t) = A\,\sin(k\,x - \omega\,t)\,.$$

Wavelength $\lambda = 2\pi/k$, period $T = 2\pi/\omega$, velocity $v$:

$$k\,x - \omega\,t = const \;\Rightarrow\; x - v\,t = \frac{const}{k}\,, \quad v = \frac{\omega}{k}\,.$$

**Transverse string wave (4):** Solve

$$v = \sqrt{\frac{T}{\mu}} \;\text{ for }\; T\,.$$

**Decibel (Db) (5).** With $\beta$ given in Db the attenuation factor is

$$f = 10^x \;\text{ with }\; \beta = 10\,\log_{10}(10^x) = 10\,x\,.$$

Note that the sound level is reduced by the inverse of this factor.

# Waves I - 2

**Stretched Spring (6):** Imagine that this spring is a rubber strap. With a numerical values for $v/v_0$, $n$ given, and $L_1$ known, solve

$$\left(\frac{v}{v_0}\right) = \sqrt{\frac{\mu_0\,(n\,L_1 - L_0)}{\mu\,(L_1 - L_0)}}\,.$$

for $L_0$. Note that you also need to use the definitions of $\mu_0$ and $\mu$.