Unit Conversion for Circular/Sinusoidal Motion

In general

$$2\pi \text{ radians} = 1 \text{ cycle} \iff 1 = \frac{2\pi \text{ radians}}{1 \text{ cycle}}$$

angular

$\omega \sim$ rads/s

cyclic

$f \sim$ cycles/second

Conversion

$$\omega = 2\pi\left(\frac{\text{rads}}{1 \text{ cycle}}\right) f\left(\frac{1 \text{ cycle}}{s}\right)$$

Then of course $f = 1/T$ so $\frac{2\pi}{T} = \omega \iff \frac{2\pi}{\omega} = T$

What about spacial quantities?

angular

$k \sim$ rads/m

cyclic

$\lambda \sim$ wavelength (meters/cycle)

Conversion

$$\frac{2\pi}{\lambda} = k$$

Sometimes you may see someone define "wavenumbers" which are defined as

$$\nu = \frac{1}{\lambda}$$

and are often in units of cm^{-1}. This is very common in infrared and ramen spectroscopy. These spectroscopies are related to the "vibrational states" of molecules and find applications in chemical gas detection. Instrumentation for Raman and Infared spectroscopy uses wavenumbers (cm^{-1}) The relative locations of peaks is related to

$$\omega = \sqrt{\frac{\kappa}{m}} = \sqrt{\frac{\text{spring constant}}{\text{mass}}}$$