Vibrations and Waves

Basic Formulas

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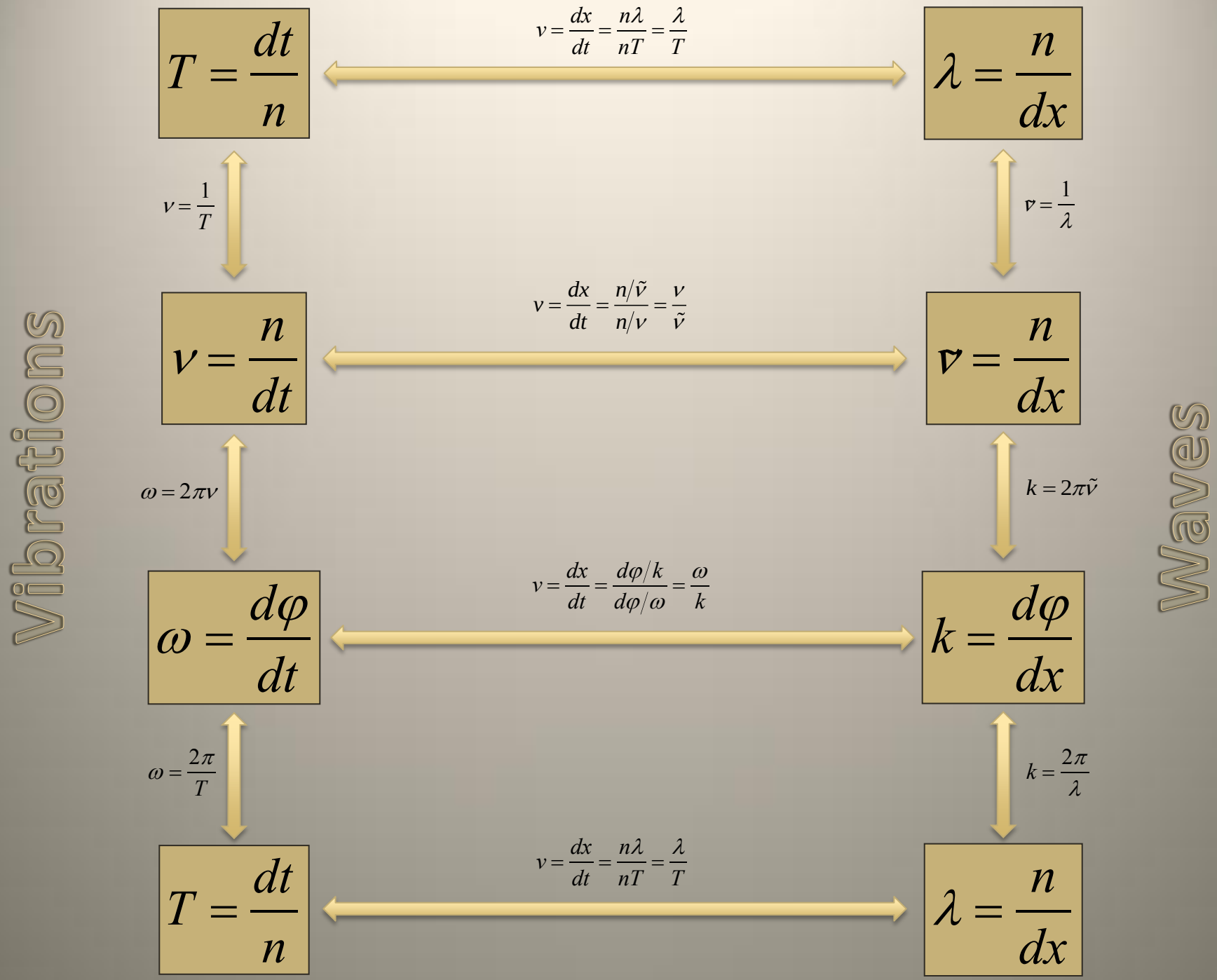
Vibrations
Waves
$T = \frac{dt}{n}$
$v = \frac{dx}{dt} = \frac{n\lambda}{nT} = \frac{\lambda}{T}$
$\lambda = \frac{n}{dx}$
$\nu = \frac{1}{T}$
$\tilde{\nu} = \frac{1}{\lambda}$
$\nu = \frac{n}{dt}$
$v = \frac{dx}{dt} = \frac{n/\tilde{\nu}}{n/\nu} = \frac{\nu}{\tilde{\nu}}$
$\tilde{\nu} = \frac{n}{dx}$
$\omega = 2\pi\nu$
$k = 2\pi\tilde{\nu}$
$\omega = \frac{d\varphi}{dt}$
$v = \frac{dx}{dt} = \frac{d\varphi/k}{d\varphi/\omega} = \frac{\omega}{k}$
$k = \frac{d\varphi}{dx}$
$\omega = \frac{2\pi}{T}$
$k = \frac{2\pi}{\lambda}$
$T = \frac{dt}{n}$
$v = \frac{dx}{dt} = \frac{n\lambda}{nT} = \frac{\lambda}{T}$
$\lambda = \frac{n}{dx}$

Period & Wavelength

$$T = \frac{dt}{n} \qquad v = \frac{dx}{dt} = \frac{n\lambda}{nT} = \frac{\lambda}{T} \qquad \lambda = \frac{n}{dx}$$

Period	Wavelength
The time for one complete oscillation	The length of one complete wave

Frequency & Wave number

$$\nu = \frac{n}{dt} \quad \nu = \frac{dx}{dt} = \frac{n/\tilde{\nu}}{n/\nu} = \frac{\nu}{\tilde{\nu}} \quad \tilde{\nu} = \frac{n}{dx}$$

Frequency	Wave number
The N° of complete oscillation per unit time	The N° of complete wave per unit length

Angular Frequency & Angular Wave number

$$\omega = \frac{d\varphi}{dt} \qquad v = \frac{dx}{dt} = \frac{d\varphi/k}{d\varphi/\omega} = \frac{\omega}{k} \qquad k = \frac{d\varphi}{dx}$$

Angular Frequency	Angular wave number
The rate of change in phase per unit time	The rate of change in phase per unit length