

EL1-004 (2004-03-10)

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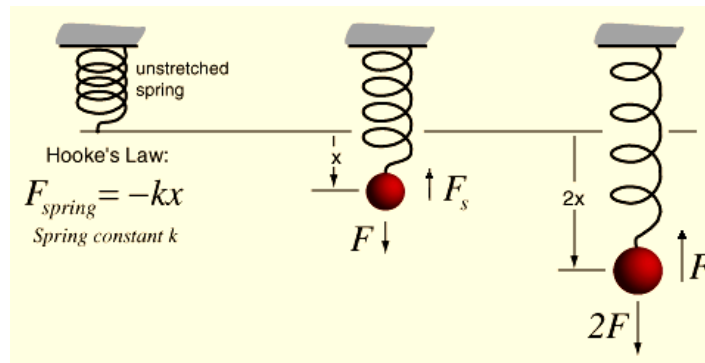
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$$F_s = -kx$$

F_s x , k

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- ² Elasticity
- ³ Elastic
- ⁴ Strain
- ⁵ Stress
- ⁶ Young's modulus

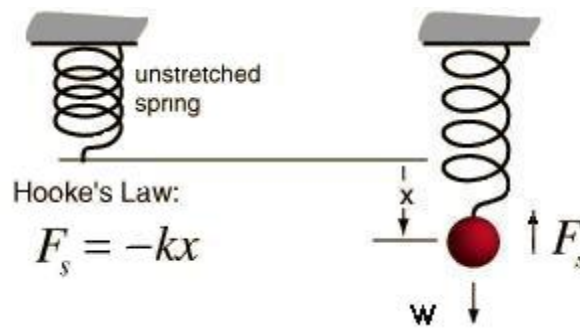
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(M)

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x

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$$\begin{cases} F_s = -kx \\ W = Mg \end{cases} \Rightarrow W + F_s = 0 \quad \Rightarrow \quad Mg = kx \quad (1)$$

: (1)

$$k = \frac{Mg}{x}$$

$$M = 0.327 \text{Kg} , x = 0.12 \text{m}$$

$$k = \frac{0.327 \times 9.8}{0.12} = 26.7 \frac{\text{N}}{\text{m}}$$

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$$\Delta M = 0.001 \text{Kg}$$

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$$\Delta x = 0.001 \text{m}$$

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$$\Delta k = \frac{M \times \Delta x + \Delta M \times x}{x^2} g = \frac{0.327 \times 0.001 + 0.001 \times 0.12}{0.12^2} \times 9.8 \Rightarrow \Delta k = 0.3 \frac{\text{N}}{\text{m}}$$

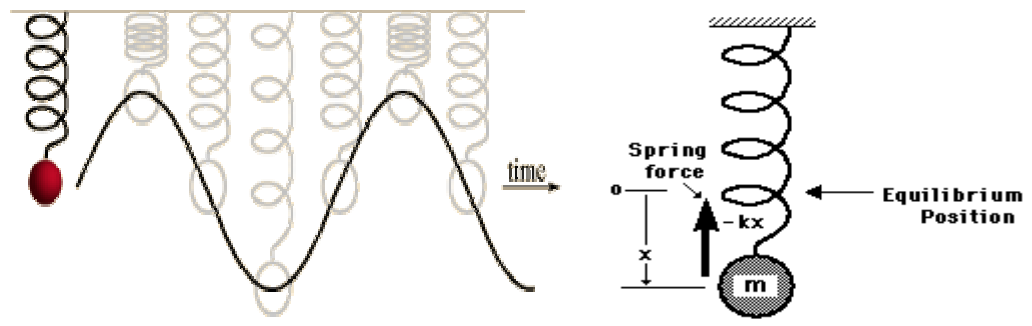
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$$\frac{\Delta k}{k} = 0.11, \quad = 11\%, S = 87.7.$$

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$$\begin{aligned} F_s &= -kx \\ F_s &= ma \end{aligned} \Rightarrow a = -\left(\frac{k}{m}\right)x$$

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 $\omega = \sqrt{\frac{k}{m}}$

: , $\omega = \frac{2\pi}{T}$

$T = 2\pi\sqrt{\frac{m}{k}}$ (2)

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$T = \frac{t}{N}$

$k = \frac{N}{T} \cdot \frac{t}{T}$ (2)

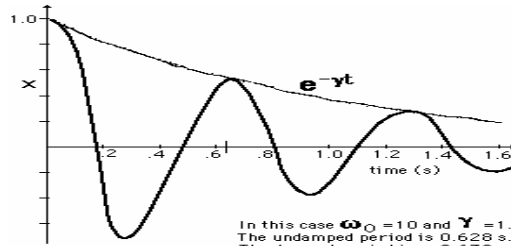
$T = 0.7s$, $t = 7s$, $N = 10$

$k = 26.3 \frac{N}{m}$, (2)

$g = 9.6 \frac{m}{s^2}$ (1)

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$$T = 2\pi \sqrt{\frac{M + \frac{M_s}{3}}{k}}$$

M_s M

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$$\frac{1}{k} = \frac{1}{k_1} + \frac{1}{k_2} + \dots + \frac{1}{k_N}$$

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$$k = k_1 + k_2 + \dots + k_N$$

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