

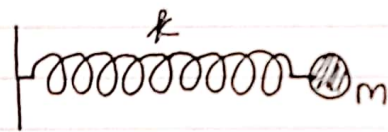
Kelompok 5

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Newton $\rightarrow$ Gaya $\rightarrow$ Vektor

Lagrange $\rightarrow$ Tinjauan energi $\rightarrow$ Skalar

Tinjau Mekanika newton dan lagrange untuk osilasi Harmonik



1) Tinjauan menggunakan newton

$$F = m \cdot a$$

$$-kx = m \cdot a$$

$$-kx = m \cdot \ddot{x}$$

$$m\ddot{x} + kx = 0$$

$$\ddot{x} + \frac{k}{m}x = 0$$

2) Tinjauan menggunakan Lagrange

Koordinat umum $x, \dot{x}$

$$\text{Energi Kinetik} \rightarrow T = \frac{1}{2} m \dot{x}^2$$

$$\text{Energi potensial Pegas} \rightarrow V = \frac{1}{2} kx^2$$

$$L = T - V$$

$$L = \frac{1}{2} m \dot{x}^2 - \frac{1}{2} kx^2$$

Substitusikan ke persamaan lagrange ;

$$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{x}} \right) = \frac{\partial L}{\partial x}$$

$$\frac{d}{dt} (m\dot{x}) = -kx$$

$$m\ddot{x} = -kx$$

$$m\ddot{x} + kx = 0$$

$$\ddot{x} + \frac{k}{m}x = 0$$