PHYS 325: Lecture 14

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Lecture Span

- Harmonic & Damped Oscillators

Harmonic & Damped Oscillators

Simple harmonic motion

$$m_{eff}\ddot{x} + k_{eff}x = 0 \tag{1}$$

Physical Pendulum

Given a distance L from the COM, then the set-up would be

$$I\vec{\alpha} = \vec{\tau} \tag{2}$$

Note:

$$T = \frac{1}{2}I_p\dot{\theta}^2 \tag{3}$$

Damped Harmonic Oscillator

Oscillations are damped due to friction or some other opposing force. Thus

$$\dot{E} \neq 0 \tag{4}$$

Thus we have that

$$\dot{E} = P_{\text{diss}} \tag{5}$$

$$= F\dot{x} = F \cdot v \tag{6}$$