

Lecture #13

Small oscillations

$$L = \frac{1}{2} \sum_{ij} m_{ij} \dot{x}_i \dot{x}_j - K_{ij} x_i x_j$$

Small oscillations: expand V to $\mathcal{O}(x^2)$
" coef of T to $\mathcal{O}(p^2)$

$$EL = m_{ij} \dot{x}_i \dot{x}_j - K_{ij} x_i x_j = 0$$

$$\left(-\omega_{\alpha}^2 m_{ij} - K_{ij} \right) A_{\alpha} = 0$$

$$\omega_{\alpha}^2 \in \mathbb{R}$$

Today: normal modes

Vb example: coupled pendulums

Vc zero modes