

$$I = \sum_i q_i^2,$$

$$K = \frac{1}{2} \sum_i \dot{q}_i^2, \quad V_\alpha = \frac{1}{\alpha} \sum_{i < j} r_{ij}^\alpha$$

$$\Rightarrow \frac{d^2 I}{dt^2} = 4K - 2\alpha V_\alpha = 4E - 2(2 + \alpha)V_\alpha$$