

$$\mu = \sum_s \mu_s q_s + \frac{1}{2!} \sum_{s,s'} \mu_{ss'} q_s q_{s'} \quad (1)$$

$$\Pi = \sum_s \Pi_s q_s + \frac{1}{2!} \sum_{s,s'} \Pi_{ss'} q_s q_{s'} \quad (2)$$

$$U = \sum_s \frac{1}{2!} m_s \omega_s^2 q_s^2 + \frac{1}{3!} g_s q_s^3 + \sum_{s,s'} \frac{1}{2!} (g_{ss'} q_s^2 q_{s'} + g_{s's} q_s q_{s'}^2) \quad (3)$$

$$U = \sum_s F_s q_s + \sum_s \frac{1}{2} m_s \omega_s^2 q_s^2 + \Pi_{ss'} q_s q_{s'} \quad (4)$$