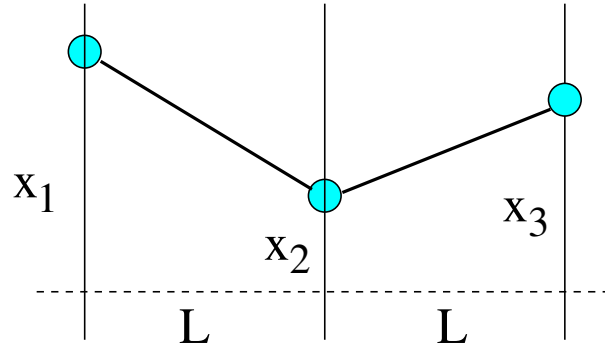


[mex114] What is the physical nature of these modes?

Three beads of mass m each are constrained to slide without friction along parallel wires. The beads are connected to each other by rubber bands of negligible mass which are stretched considerably ($L \gg L_0$). (a) Describe the physical nature of the modes specified by the generalized coordinates q_1, q_2, q_3 , where

$$x_1 = q_1 + q_2 + \frac{1}{2}q_3, \quad x_2 = q_1 - q_3, \quad x_3 = q_1 - q_2 + \frac{1}{2}q_3.$$

Give a quantitative description of the motion that ensues if the system is initially at rest with only one the generalized coordinates displaced infinitesimally: (b) $0 < q_1^{(0)} \ll L$, $q_2^{(0)} = q_3^{(0)} = 0$, (c) $0 < q_2^{(0)} \ll L$, $q_1^{(0)} = q_3^{(0)} = 0$, (d) $0 < q_3^{(0)} \ll L$, $q_1^{(0)} = q_2^{(0)} = 0$.



Solution: