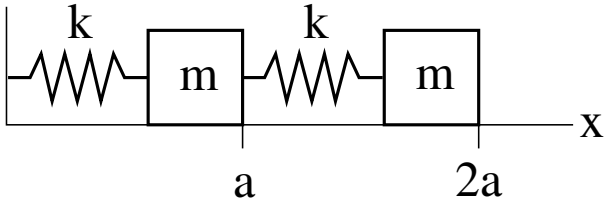
[mex123] Blocks and springs in series

Consider a system of two blocks of mass m attached by springs of stiffness k to each other and to a rigid wall. The blocks can slide without friction along the x-axis. When the springs are relaxed, the blocks are at the positions $x_1 = a$ and $x_2 = 2a$. (a) Find the Lagrangian $L(q_1, q_2, \dot{q}_1, \dot{q}_2)$ for the system, where q_1, q_2 are the displacements of the two blocks from their equilibrium positions. (b) Find the angular frequencies ω_1, ω_2 of the two normal modes by solving the characteristic equation. (c) Find the amplitude ratios $A_1^{(k)}/A_2^{(k)}, k = 1, 2$ for the two normal modes.



Solution: