

1. (25 points) A rectangular block of mass m is resting on a horizontal surface (under the influence of gravity in the vertical direction). The block is constrained to move only in the horizontal direction and slides without friction. It is attached to a vertical wall with two springs (spring constants k_1 and k_2) as shown in Fig. 1 below. The springs are joined at horizontal position x_1 (in between the wall and the block) and the block is at horizontal position x ($x = x_1 = 0$ when the springs are exerting no force). You may assume that the springs have no mass and do not move in the vertical direction.

- a) What is the equation of motion for coordinate x of the block?
- b) What is the natural period of oscillation of position x of the block?

