

Name: [5 pts]

1) Consider a small box with mass $m = 1.0$ kg and a big box with mass $M = 5$ kg. We put the small box on the side of the big box and press with the force F , see fig. 1. The coefficients of static friction between the two boxes is $\mu_s = 0.5$, and the friction between the big box and the ground is negligible.

- Draw the separate free body diagrams for the boxes. [2 pts]
- Write down the equations of motion for each box. [4 pts]
- What is the static friction force on the small box, if we know that the box is not sliding? [1 pt]
- Find the normal force between the boxes as a function of F . [2 pts]
- Find the condition on F so that the small box does not slide relative to the big box. [2 pts]

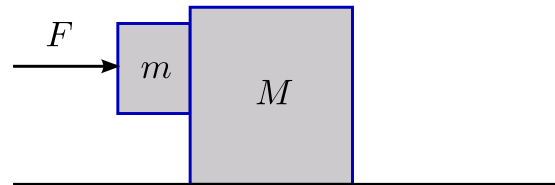


Figure 1: The mass m is not slipping down.