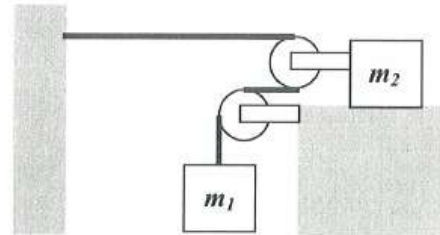


Cvičenie 1.12.2022

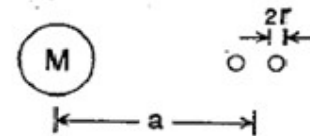
Príklad 1

4. Two masses, two pulleys and a rope

A block of mass m_1 is attached to a massless ideal rope. The rope goes around a massless pulley and then goes around a second massless pulley that is attached to a block of mass m_2 which is free to slide on a frictionless table. The other end of the rope is anchored to a wall. What is the acceleration of m_1 when the system is released?



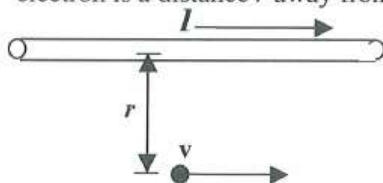
Two small spherical objects, each of radius r and uniform density ρ are a distance a from a large mass M . Note that $r/a \ll 1$. Find the critical density ρ_c above which the two small objects will not be pulled apart by M .



Príklad 2

3. Current carrying wire

An electron of mass m moves at velocity v parallel to a wire carrying current I . The electron is a distance r away from the wire. This is the frame F .



- Find the force on the electron due to the current in the wire.
- Find a frame F' in which there is no magnetic force on the electron. Find all forces on the electron in F' .

Príklad 3

PROBLEM: Molecules of an ideal gas have internal energy levels that are equidistant, $E_n = n\varepsilon$, where $n = 0, 1, \dots$ and ε is the level spacing. The degeneracy of n th level is $n + 1$. Find the contribution of these internal states to the energy of the gas of N molecules at temperature T .