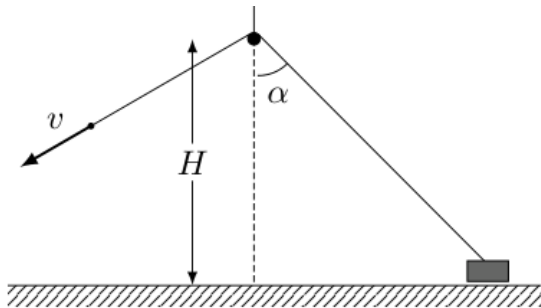


6. Pull-up bar rope (5 points) — *Jaan Kalda*. A rope is thrown over a horizontal pull-up bar at height H above the frictionless floor. One end of the rope is tied to a heavy weight resting on the floor; the other end is pulled so that the length of the rope between the bar and the weight decreases at a constant rate v . At a given moment, this segment makes an angle α with the vertical (see figure); the weight is still in contact with the floor. Gravitational acceleration is g .



- i) (1 point) Find the speed u of the weight.
- ii) (1 point) Find the magnitude of the acceleration of the weight.
- iii) (3 points) Find the angle α_0 at which the weight lifts off the floor.