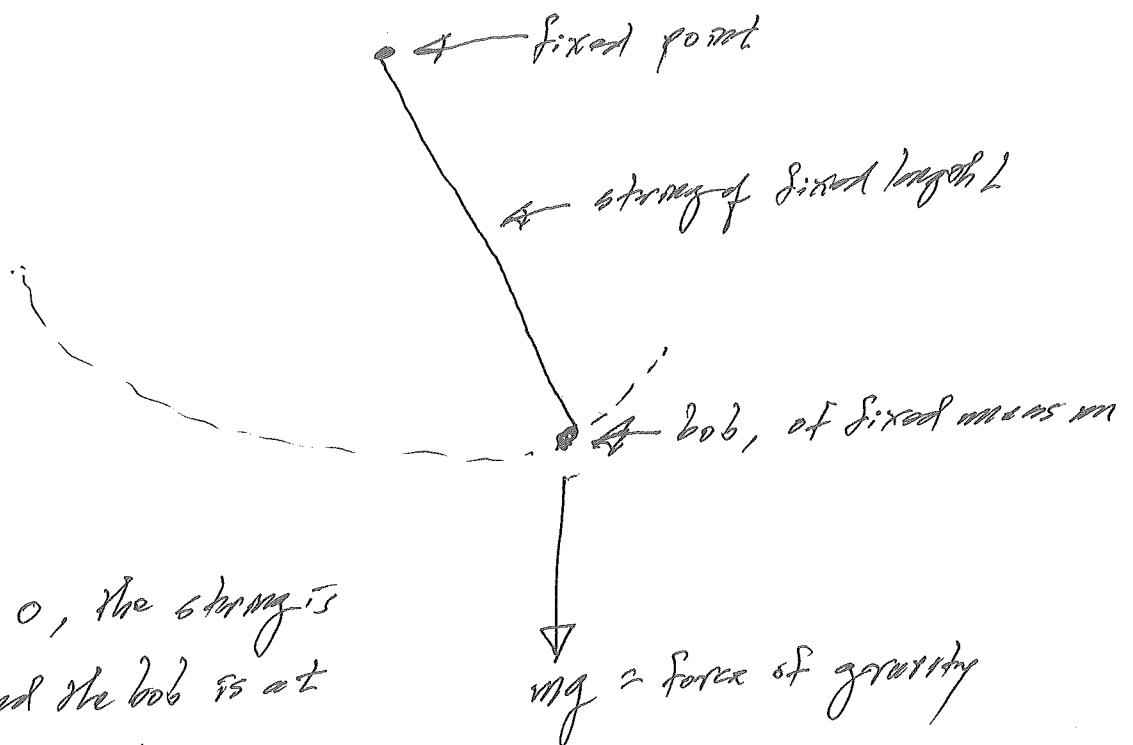


The Pendulum

A pendulum consists of a fixed point, a string of fixed length, a bob (of negligible radius) of fixed mass, and a gravitational field, of fixed strength, as the one and only force acting on the bob. The string connects the fixed point and the bob, and the string is always taut. The distance (along the arc of the circle whose radius is the string) of the bob from the equilibrium (vertical) position is considered to be a function of time. Since the string is always taut, the greatest distance of the bob from the equilibrium position (which is called the amplitude of the pendulum) must be such that the string makes an angle of less than $\pi/2$ with the vertical. It is assumed that the bob is in motion (that is, is not simply hanging vertically). It is also assumed that the string is of length L , the bob is of mass m , and the acceleration of the bob due to the gravitational field is g .

The radius of the bob is considered negligible.

The following diagram then obtains:



At time 0 , the string is taut, and the bob is at angle $0 < |\theta| < \pi/2$

from the vertical.

However, this position of the bob is not necessarily its maximum displacement from the vertical line through the fixed point.