

CLASSICAL MECHANICS TFY4345 - Exercise 3

(1a) Solve the brachistochrone problem where the coordinate axes are laid as in Fig. 1. The particle starts from the origin, at rest, when $t = 0$. Find a closed analytical form for the coordinates x and y .

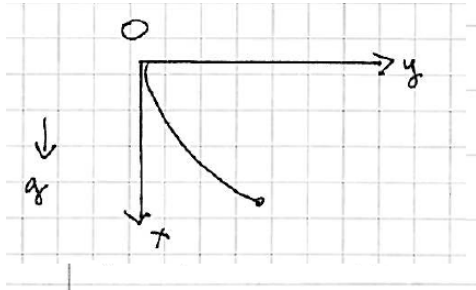


FIG. 1: (Color online). The system under consideration in a).

gle $\pi/4$ with the y -axis at $t = 0$. Show that the brachistochrone curve is determined from the equation

$$[y'(x)]^2 = f(v_0, g, x) \quad (1)$$

and identify the function $f(v_0, g, x)$ where $v_0 = |\mathbf{v}_0|$.

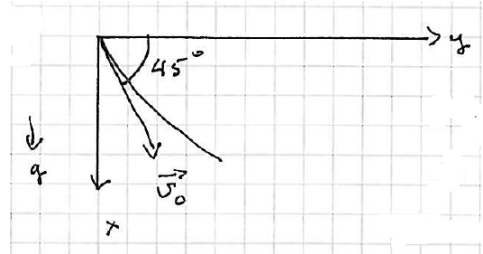


FIG. 2: (Color online). The system under consideration in b).

(1b) Assume that the initial velocity is now \mathbf{v}_0 , making an an-