HAMILTONIAN DYNAMICS OF THE BRACHISTOCHRONE PROBLEM

PROBLEM SHEET 5: FYS3120

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1. Coriolis and Centrifugal forces

A particle with mass m moves freely on a horizontal plane. There are no constraints, but in the following we will consider the free motion described in a rotating reference frame. We refer to the Cartesian coordinates of a fixed frame as (x, y) and the coordinates of the rotating frame as (ξ, η). They are related by the standard expressions

$$x = \xi \cos \omega t - \eta \sin \omega t, \tag{1}$$

$$y = \xi \sin \omega t + \eta \cos \omega t, \tag{2}$$

where ω is the angular velocity of the rotation.

1.a. **Lagrangian.**

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