“Coriolis force”

“Uniform circular motion & simple harmonic motion”

Outline

Goals

I. Designing a lecture demonstration of Coriolis force and creating an active model of the device.

II. Designing a lecture demonstration of similarity of the uniform circular motion to simple harmonic motion and creating an active model of the device.

I. Coriolis force

An object in an accelerated reference frame can experience a number of fictitious forces of inertia: the centrifugal force on a motionless object; Coriolis force on the object moving with constant speed and Euler force on an object in a rotational motion relative to the reference frame. The Coriolis force on the moving object creates an apparent bent trajectory in the rotating frame of reference like Earth. This trajectory seems quite linear for an observer in the inertial reference frame.

The project can be divided into the following main stages:

1. Study of existing models for using as a lecture demonstration of the Coriolis force (PASCO and other manufacturers).
2. Designing of the model for the lecture demonstration.
3. Assembling the model.
4. Testing the model. Creating drawings for a producer of the device. Writing a handout for a user.

II. Similarity of uniform circular motion to simple harmonic motion

If a displacement of a point (mass) in a uniform circular motion is decomposed to a pair of mutually orthogonal components (e.g. x- and y-components in Cartesian system of coordinates), each component would oscillate with the period of rotation of the point and with amplitude equal to the radius of the circle.

The project can be divided into the following main stages:

1. Study of existing equipment suitable for using as a lecture demonstration of the uniform circular motion together with the simple harmonic motion with same amplitude, angular speed and phase (PASCO and other manufacturers).
2. Designing of the model for the lecture demonstration.
3. Assembling the model.
4. Testing the model. Creating drawings for a producer of the device. Writing a handout for a user.