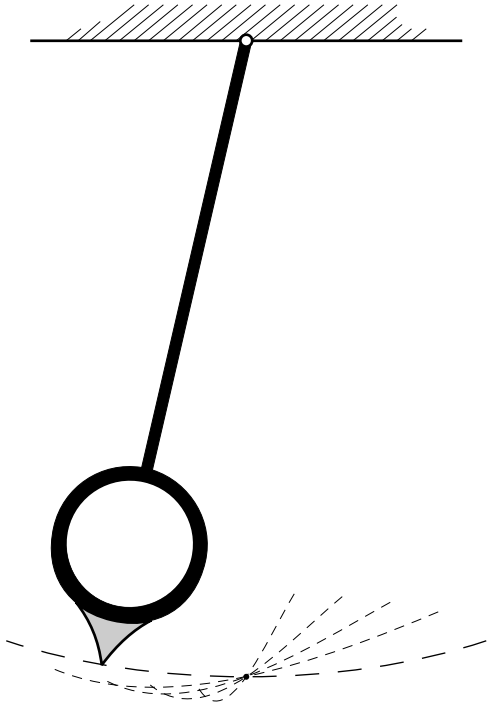
PHYSNET

MISN-0-40

FOUCAULT'S PENDULUM



Project PHYSNET Physics Bldg. Michigan State University East Lansing, MI

FOUCAULT'S PENDULUM

by

Peter Signell

Title: **Foucault's Pendulum**

Author: Peter Signell, Michigan State

Version: 2/1/2000 Evaluation: Stage B0

Length: 1 hr; 8 pages

Input Skills:

1. Vocabulary: rotating frame of reference (MISN-0-18).
2. Explain the origin of the Coriolis force and state it in vector form (MISN-0-18).

Output Skills (Project):

P1. Present a lecture that shows the derivation of the angular velocity of precession of Foucault's Pendulum as a function of the angular velocity of the earth and the angle of colatitude at the position of the pendulum. State the historical importance of the pendulum. Start your derivation with Newton's second law for observables specified in a rotating frame of reference. For your lecture you may have notes on both sides of one 4"×5" card.

External Resources (Required):

1. Access to a library and the amount of time that you personally need for constructing a lecture.

THIS IS A DEVELOPMENTAL-STAGE PUBLICATION
OF PROJECT PHYSNET

The goal of our project is to assist a network of educators and scientists in transferring physics from one person to another. We support manuscript processing and distribution, along with communication and information systems. We also work with employers to identify basic scientific skills as well as physics topics that are needed in science and technology. A number of our publications are aimed at assisting users in acquiring such skills.

Our publications are designed: (i) to be updated quickly in response to field tests and new scientific developments; (ii) to be used in both classroom and professional settings; (iii) to show the prerequisite dependencies existing among the various chunks of physics knowledge and skill, as a guide both to mental organization and to use of the materials; and (iv) to be adapted quickly to specific user needs ranging from single-skill instruction to complete custom textbooks.

New authors, reviewers and field testers are welcome.

PROJECT STAFF

Andrew Schnepp	Webmaster
Eugene Kales	Graphics
Peter Signell	Project Director

ADVISORY COMMITTEE

D. Alan Bromley	Yale University
E. Leonard Jossem	The Ohio State University
A. A. Strassenburg	S. U. N. Y., Stony Brook

Views expressed in a module are those of the module author(s) and are not necessarily those of other project participants.

© 2001, Peter Signell for Project PHYSNET, Physics-Astronomy Bldg., Mich. State Univ., E. Lansing, MI 48824; (517) 355-3784. For our liberal use policies see:

`http://www.physnet.org/home/modules/license.html`.

FOUCAULT'S PENDULUM

by

Peter Signell

1. Procedure

1. This is a learner-originated unit. You must go to a library (see this unit's *local Guide*) and find the derivation described in this unit's *ID Sheet*. We suggest the derivation in either of these books:

   - *Classical Mechanics*, V. Barger and M. Olson, McGraw-Hill (1973 or later)
   - *Theoretical Mechanics*, J. S. Ames and F. D. Murnaghan, Ginn and Co., Boston (1929).

2. Prepare a lecture that satisfies the statement in this unit's *ID Sheet*. In your lecture you can use prepared notes that occupy up to both sides of a single 4"×5" card.

3. Make sure you understand each part of your lecture. If you only memorize the derivation and don't understand it, the examiner is required to give you a grade of zero.

4. For instructions on how to receive credit for this unit, see this unit's *Local Guide*.

Acknowledgments

Preparation of this module was supported in part by the National Science Foundation, Division of Science Education Development and Research, through Grant #SED 74-20088 to Michigan State University.

LOCAL GUIDE

The readings for this unit are on reserve for you in the Physics-Astronomy Library, Room 230 in the Physics-Astronomy Building. Ask for them as "The readings for CBI Unit 40." Do **not** ask for them by book title.

To get credit for your lecture, come to the CBI Exam Room as usual and ask for Exam U40 just as you would ask for any other unit exam. After getting the exam, fill in the usual blanks on an exam answer sheet. Give your sheets to the Exam Manager at the computer and ask him or her to read the Exam Sheet and get you an examiner to hear your lecture. Give the examiner your sheets and present your lecture. The examiner will retain the sheets and will grade your lecture after you leave. Your exam, with the examiner's comments, will be made available for your perusal in the same way as any other exam.