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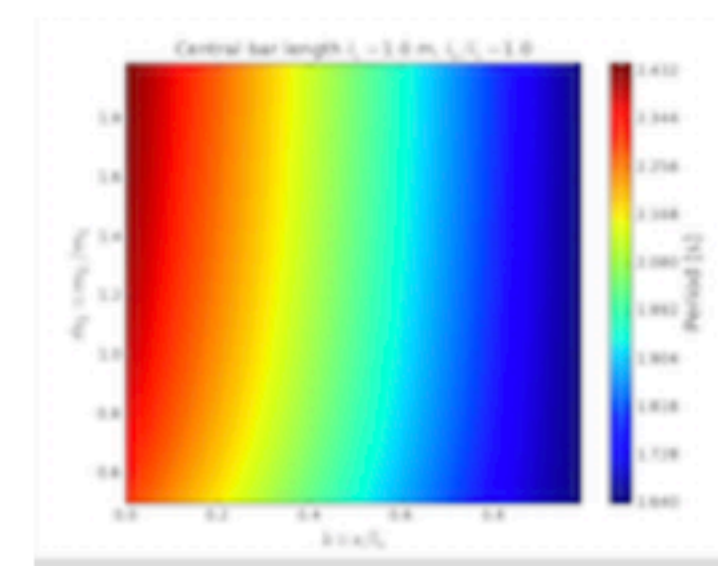
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A Rigid Three-bar Pendulum

Developed by E. Behringer - Published July 31, 2016

This set of exercises guides the student in exploring computationally the behavior of a physical pendulum consisting of three bars. It also requires the student to generate, observe, and describe the results of simulating the rotational motion for different configurations of the pendulum. The numerical approach used is the half-step approximation (a modified Euler) method. Please note that this set of computational exercises can be affordably coupled to simple classroom experiments with meter sticks.



Subject Area Mechanics

Level Beyond the First Year

Available Implementation Python

Learning Objectives Students who complete this set of exercises will be able to

- express an equation predicting the period of small oscillations in terms of dimensionless (“scaled”) variables suitable for coding (**Exercise 1**);
- produce both contour plots and 1D plots of the period of small oscillations versus scaled variables (**Exercises 1 and 2**);
- derive the equation of motion for the pendulum (**Exercise 3**);
- computationally model the motion of a three-bar pendulum with damping using the half-step approximation integration algorithm (**Exercise 4**);

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