

Determination of Damped Harmonic Oscillation through Woltenhofen's Pendulum

Anchalee Malaithong, Watchara Liewrian*, and Kheamrutai Thamaphat
Department of Physics, Faculty of Science, King Mongkut's University of Technology Thonburi, Bangmod, Thungkru, Bangkok 10140

*E-mail: watchara.liewrian@mail.kmutt.ac.th

Abstract

A simple demonstration set for investigating the damping effect of Waltenhofen's eddy current pendulum was developed in this work. The demonstration set composes of a metal plate moving through a magnetic field. The magnetic field was generated by applying a DC current to two solenoid coils. The influences of the magnetic field strength, the material type and the pendulum length of metal plate on the damping effect were studied. The results showed that the chaotic motion of the pendulum occurred at a low magnetic field and the damping action increased with increasing the magnetic field strength. The material type and the length of metal plate influenced on the decay behavior of the damped oscillation. The heavier weight and low resistance of metal plate have higher angular momentum and resulted on the slower pendulum decay. This demonstration set, which is an example of magnetic brake system, can be applied for the contribution on physics teaching as science, technology, engineering and mathematics (STEM) education in high school. It can improve students' knowledge on the magnetic induction and the damping oscillation.

Keywords : Woltenhofen Pendulum: Damped Harmonic Oscillation: Electromagnetic Induction

Author: Ms MALAITHONG, Anchalee (Department of Physics, Faculty of Science, King Mongkut's University of Technology Thonburi, Bangmod, Thungkru, Bangkok 10140)

Co-authors: Ms THAMAPHAT, Kheamrutai (Department of Physics, Faculty of Science, King Mongkut's University of Technology Thonburi, Bangmod, Thungkru, Bangkok 10140); Mr LIEWRIAN, Watchara (Department of Physics, Faculty of Science, King Mongkut's University of Technology Thonburi, Bangmod, Thungkru, Bangkok 10140)

Presenter: Ms MALAITHONG, Anchalee (Department of Physics, Faculty of Science, King Mongkut's University of Technology Thonburi, Bangmod, Thungkru, Bangkok 10140)

Track Classification: Physics Education