

# The Mathematics of the Single Pendulum

## What are the Physical Implications?

Jim Sochacki  
*Department of Mathematics*  
*James Madison University*

September 17, 2009

**Abstract:** In this talk I will derive the motion of the single pendulum with a moving pivot purely through mathematics and show that physics forces us to make a mathematical decision. I will then turn these equations of motion into a purely polynomial system of ODEs and discuss the mathematics of this system. I will then decouple these ODEs and discuss the physics this implies. Finally, I will discuss the mathematics and physics of the moving pivot. Audience participation will most likely be significant.