

“You spin me right round baby right round like a record baby right round round round...” — Pete Burns (Dead or Alive)

The Trivial Notions Seminar Proudly Announces

The Geometry of Rigid Body Dynamics, or, How Not to Throw Books

A talk by
Ethan Street

Abstract

The theory of force-free rigid body dynamics, which is usually attributed to Euler for his equations of motion, and to Poincaré for his description of the so called Poincaré ellipsoid, gives a precise mathematical framework with which to understand how objects rotate in space in the absence of external forces. In this talk I will go through the derivation of the equations of motion from scratch. I will also describe Poincaré’s geometric interpretation of the dynamical system, which allows one to visualize the motion explicitly. Finally, we will use Euler’s equations to show why it is that some objects can be spun in a stable way (like a thin rod or symmetric object, such as a cube), while others tumble chaotically (like a book spun on its horizontal axis). Although the talk will be, strictly speaking, a physics talk, the emphasis will be on the mathematical derivation of the equations of motion. No prior knowledge of physics will be assumed.

Thursday, October 30th at 2:07 pm
Science Center 507