EME 134: Vehicle Stability

(Vehicle Dynamics & Control)



Spring 2020

Prof. Jason K. Moore

Zoom introduction



Primary Instructor: Jason K. Moore

BS @ ODU 2004, Fulbright TU Delft 2009, MS/PhD @ UCD 2007/2012

Assistant Professor of Teaching since 2015 @ UC Davis

Teaches: dynamics, vibrations, biomechanics, mech. design, computer graphics, and capstone









Projects



Laboratorium of Marvelous Mechanical Motum

https://mechmotum.github.io/







Google Summer of Code







Teaching Assistant: Russell Hawkins



- MSc student working with Prof. Lin
- Researching machine learning techniques for battery modeling
- Can ride a unicycle, therefore is an expert in vehicle stability

Vehicle Dynamics

Over/under steering cars



Drifting



Tire force generation



Trailer dynamics



Rolling and sliding wheels



Motorcycle Speed Wobble



Extreme maneuvers



Interesting vehicles



Aircraft roll oscillations



Aircraft pitch oscillations



Other more rare aircraft oscillations



Modeling and Simulation of Vehicles



Course Learning Objectives

- create simple mathematical models of a variety of vehicles
- identify when vehicles are stable/unstable
- identify parameters that affect stability
- describe typical modes of motion for various vehicles
- utilize simulations of vehicles for design purposes
- analyze vehicle motion for desirable characteristics
- apply simple automatic control to stabilize vehicles