ME225DS: Dynamical Systems with Symmetry
Winter 2008

Instructor: Jeff Moehlis, `moehlis@engineering.ucsb.edu`

Lectures: Tuesday, Thursday 3:30-4:45, Phelps 1420
    No lecture: Thursday, January 17
    No office hours Wednesday, January 16, Thursday January 17

Office Hours: Wednesday 11:00-12:00, Thursday 10:00-11:00, 2350 Engr II Bldg

Course Webpage: `http://www.engineering.ucsb.edu/~moehlis/ME225DS`

Prerequisites: ME215A and ME215B, or permission of instructor

Grades: based on homework

The following topics will be covered
- group theory
- derivation of ordinary differential equation models by symmetry arguments
- classification of solutions by symmetry
- normal form symmetry
- equivariant bifurcation theory
- global bifurcations with symmetry
- heteroclinic cycles
- forced symmetry-breaking

There is no textbook for the class, but it will draw upon the following references:
- J. Moehlis and E. Knobloch. Equivariant Dynamical Systems
  `http://www.scholarpedia.org/article/Equivariant_Dynamical_Systems`

- J. Moehlis and E. Knobloch. Equivariant Bifurcation Theory
  `http://www.scholarpedia.org/article/Equivariant_Bifurcation_Theory`

- M. Golubitsky and I. Stewart. *The Symmetry Perspective*, 2002.

- M. Golubitsky, I. Stewart, and D.G. Schaeffer. *Singularities and Groups in Bifurcation Theory, Volume II*, 1988.

- R. Hoyle. *Pattern Formation: An Introduction to Methods*, 2006.

Useful books on dynamical systems:

- S. Wiggins, *Introduction to Applied Nonlinear Dynamical Systems and Chaos, Second Edition*, 2003.

- J. Guckenheimer and P. Holmes, *Nonlinear Oscillations, Dynamical Systems, and Bifurcations of Vector Fields*

- S. H. Strogatz, *Nonlinear Dynamics and Chaos: With Applications in Physics, Biology, Chemistry, and Engineering*

- P. Glendinning, *Stability, Instability, and Chaos*