APM 560

Applied Dynamical Systems

Instructor: Dieter Armbruster, School of Mathematical and Statistical Sciences, WXLR 821, 965-5441
meeting time: 12:15 - 1:30   MW
place: ED 204
line number: 31502

Topics
This course will present the mathematical tools to analyze nonlinear ODEs. Its emphasis is on the geometrical theory of dynamical systems. Topics include: Poincare maps, center manifolds, local and global bifurcations, normal forms, averaging theory, transversal homoclinic orbits and chaos, and geometric singular perturbation theory. Applications in mechanics, electrical engineering and biology will be strongly emphasized.

Prerequisits:
APM 501 or instructor approval. MAT 452 (Chaos) is a plus but not required.

Text:

1. *Nonlinear Oscillations, Dynamical Systems, and Bifurcations of Vector Fields*, J.Guckenheimer and Ph. Holmes, Springer Verlag, 1983, ISBN- 978-1-4612-7020-1

2. *Introduction to Applied Nonlinear Dynamical Systems and Chaos*, S. Wiggins, Springer Verlag,; 2nd edition, 2003 ISBN-13: 978-1441918079

3. *Elements of Applied Bifurcation Theory,* Yuri Kuznetsov, Springer; 3rd ed. Softcover of orig. ed. 2004 edition (November 25, 2010) ISBN 978-1-4419-1951-9

Any one of the three books is fine. Additional references given in class.