

Math 429/629 Topics in Applied Analysis.

Instructors: Chris Herald (herald@unr.edu) and Jeff Mortensen (jm@unr.edu).

Course name: Dynamical Systems

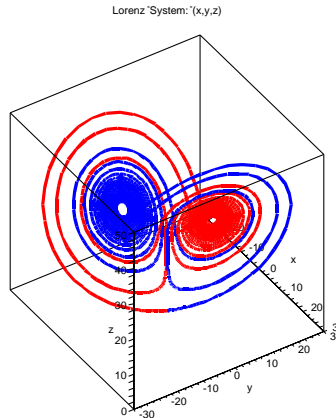
Text: (Required) An Introduction to Dynamical Systems, R. Clark Robinson, Pearson Prentice Hall, 2004, ISBN 0-13-143140-4

Supplemental Reading (optional): Nonlinear Dynamics and Chaos, with Applications to Physics, Biology, Chemistry, and Engineering, Steven H. Strogatz, Addison-Wesley, 1994, ISBN 0-201-54344-3

Lecture Hours: 4:00pm-5:15pm, TTh

Recommended Prerequisites: Math 283, Math 285, and Math 330.

Course Description: This course is a study of continuous dynamical systems. Topics include numerical techniques for solving dynamical systems and graphical methods such as phase portraits to represent system behavior. We will discuss equilibrium and stability analysis, as well as techniques to detect and analyze periodic solutions and bifurcations, which are sudden changes in behavior, such as the creation of new equilibria or new periodic orbits that occur as a parameter in the system is varied slightly. Finally, we will explore chaotic dynamical systems and strange attractors.



Students in this class will learn how to use the Maple mathematical software package to carry out the numerical methods and to create phase portraits (but prior programming experience is not required). The mathematical methods developed in the course will be applied to models of complex physical phenomena, including populations competing for food, chemical oscillations, chemostats, and epidemic models. This course should be of interest to students in mathematics, engineering, or the physical sciences.