

Math 330 Advanced Ordinary Differential Equations

TTh 3:30pm - 4:45pm, Votey 254

Textbook: Nonlinear Dynamics and Chaos, by Steven Strogatz

Instructor: Prof. Jianke Yang

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Office hours: TTh 1:00-2:00pm. Additional time by appointment.

Homework: homework problems will be given on irregular basis.
Computers will be used for some of the problems.

Exams: No. But a final-term project will be assigned.

Grading: homework: 50%; project: 50%

Topics:

1. Linear Equations: Homogeneous and inhomogeneous equations; second-order linear equations; linear equations with constant coefficients; linear equations with periodic coefficients; Floquet theory (\sim two weeks).
2. Plane Autonomous Systems: Linear systems; nonlinear systems; critical points; limit cycles; Van der Pol equation (\sim three weeks)
3. Weakly Nonlinear Oscillations (\sim two weeks)
4. Bifurcation Theory (\sim two weeks)
5. Lorenz Equations, Chaos, Strange Attractors and Fractals (\sim three weeks)