

Ordinary Differential Equations II, 1MA052.

Course Webpage:

<http://www.math.uu.se/~gaidash/1MA052/1MA052.html>

Lecturer:

Denis Gaidashev, office: Ångström 14231, gaidash@math.uu.se.

Objectives of the course:

- 1) Understand the matrix methods for first order linear systems. Be able to solve the relevant problems.
- 2) Be able to state, prove and apply existence and uniqueness theorems.
- 3) Be able to use the power series techniques to solve differential equations.
- 4) Understand the non-linear systems and their stability properties; limit cycles and Poincare-Bendixson Theorem.
- 5) Understand the basics of the Sturm-Liouville theory. Be able to apply the theory in boundary value problems.
- 6) Understand and be able to approach first-order systems as continuous dynamical systems. Be able to describe the details of the dynamics of the Lorenz attractor and homoclinic phenomena.

Textbooks:

Text I: M. W. Hirsch, S. Smale, R. L. Devaney, *Differential Equations, Dynamical Systems and an Introduction to Chaos*, Academic Press (Elsevier) 2004.

Text II: R. Nagle, Edward Saff, Arthur Snider, *Fundamentals of Differential Equations*, 8th edition, (available from <http://www.coursesmart.com> as e-text).

Grading:

There will be 3 homeworks, which will account for 45% of the final grade.

There will be also a final, 3 hours, 55% of the final grade.

The purpose of this scheme is spread the risks over the length of the course.