Computeroriented Methods for Solving Differential- and Integralequations (CMDIE)

Roman Trobec
Jozef Stefan Institute
Jamova 39, 1000 Ljubljana

e-mail: roman.trobec@ijs.si
Personal URL: http://www-e6.ijs.si/~roman
Class-Web: http://www-e6.ijs.si/~roman/usalz/cmdie02_03

Contents

- Basic Definitions and Terminology, Floating Point Systems, Programming Tools - MatLab
- Linear Systems of Equations and Linear Least-square
- Eigenvalue and Singular values
- Nonlinear Equations and Interpolation,
- Numeric Integration and Differentiation,
- Simple Integral Equations,
- Introduction to Differential Equations.

Reference Book

- M.T.Heath: *Scientific Computing: An Introductory Survey, Second Edition,* McGraw Hill, New York 2001, (SC);
- *First Edition* from 1997;
- Lecture notes accessible on: `http://www.cse.uiuc.edu/heath/scicomp/notes`
- and also on Class-Web

2nd ed.

1st ed.

Supplementary Material

- W.H.Press at all.: *Numerical Recipes in C*, Cambridge University Press.
- On-Line version: `http://www.ulib.org/webRoot/Books/Numerical_Recipes/`
- Scientific Journals

Scheduling

- **Lecturing:** In four blocks, monthly on two consecutive days, during winter semester 02/03: Tuesday and Wednesday, 10-12 a.m. and 14-16 p.m, Room T05.
- **Labs:** After lectures, 12-13 a.m. and 16-17 p.m., Small Computer Room, (see syllabus for details)
- **Homework** and **projects** posting:
  - Class-Web page:

    http://www-e6.ijs.si/~roman/usalz/cmdie02_03
- **Office hours**: During Labs
- E-mail: `roman.trobec@ijs.si`

Course Organisation

- Teaching
  - Lessons: reading of the textbook, slides and notes available on Class Web,
  - Labs: practical examples from the textbook implemented in MatLab, solution of the review questions, presentations of solved homework,
  - Homework and project made individually and the solutions posted on the Class-Web page
- Examination and Grading
  - Solution of problems – 7 homeworks: 30%
  - Class Project: 20%
  - Final exam(review questions and assigned homework): 50%
- Personal communication
  - During Labs, E-mail, ...

Homework

- Self initiative work is expected here
- Students will be given to solve either exercises from the textbooks or problems defined by themselves,
- It is expected that one homework assignment for each lesson (in total 7) will be finished individually,
- The problem and results should be posted on the Class-Web page and discussed later in the class if necessary.

Project

- Up to two students can work together on an applied project,
- They have to involve a practical component– i.e. it is not a paper and pencil exercise, some working program is expected,
- Prepare the project proposal, either your own topic or a suggested one. Start thinking about potential project ideas soon!
- A written report including overview, methods, and results, should be posted on the Class-Web.

Final Exam

- There will be a final exam, covering the complete course material (books and notes can be used).
- Exam questions:
  - Review questions from the text book (electronic version available on Class-Web), and
  - Solved homework (posted by students on the Class-Web). You should study the assigned and solved homework of your colleagues.