

Mälardalen University IMa Autumn 2003	Course: MT1370 Numerical methods with MATLAB Course description
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Aim

Students need to play with the mathematics that stands behind each and every new method that they learn. In this course, theoretical consideration of concrete financial problems is complemented with computational experiments. MATLAB is extensively used as computation and visualisation tool. Our aim is to give you the skill to solve financial problems using modern computational tools.

Lectures

Each lecture, except the introductory one, starts with the presentation of solutions to problems by some group of students. After the presentation all students take part in the discussion. Methods of calculations, texts of MATLAB programs, and results will be examined. Each student must be able to explain and discuss topics related to the presentation. Making a presentation, taking part in the discussion and answering questions, all are part of the examination. This means that it is mandatory to attend each lecture. The presentation of solutions to problems and the following discussion takes about one hour. During the rest of the time the teacher will follow up the work of groups. During the last 30–45 minutes the teacher will present the outline of the material of the next lecture and problems for solving.

Project, 3 points

To pass the Project you must solve all obligatory problems.

Seminars, 2 points

In seminars, the students are expected to apply MATLAB functions to solving real-world financial problems. There will be two seminars. On the first seminar, each group makes a preliminary presentation of their report. After the presentation other groups will oppose and ask questions about the subject. One week before the second seminar all groups taking parts in the seminar and the teacher must receive the final written reports. The report must contain a title page, summary, contents, introduction, where the problem is formulated, solution, conclusions, and references. On the second seminar, each group makes the final presentation of their report and takes part in the discussion. To pass the seminar, you must actively take part in the presentation and discussion.

Marks

If you pass the Project and the seminars you will pass the course. You will pass with distinction, if you solve one half of additional problems and obtain Pass with distinction from the seminar. Your activity during the seminars each lecture will also have influence on your mark.

Time table

Number	Lecture
1.	Introduction to MATLAB
2.	MATLAB language
3.	Graphs in MATLAB
4.	Nature of numerical computations
5.	Analysing and computing cash flow streams
6.	Non-linear equations
7.	Valuation of fixed-income securities
8.	Linear systems
9.	Black–Scholes model
10.	Pricing American options
11.	Simulating asset price dynamics

Teacher

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