# Course evaluation: 2D1266 Mathematical Models, Analysis and Simulation, part I, 2005/06

**Course data**
- 2D1266 Mathematical Models, Analysis and Simulation, part I, 5 credits
- P1, P2 2005/06
- Personal: Michael Hanke, Claes Trygger, Erik von Schwerin, Danile Appelö
- Teaching sessions
  - Lectures: 48 timmar
  - Laborations: 12 timmar
- Students: 43 (including 6 PhD students)
- Credits: Laboration 2.5, written examination 2.5.
- Prestationsgrad: 66% (per 2005-03-22)
- Examinationsgrad: 49% (per 2005-03-22)

**Aims** The goals of the course are to expose the students to and give them experience of important parts of applied and numerical mathematics, give the students experience of numerical experiments using MATLAB so that they will be able to analyze equilibrium models and dynamical systems with a finite number of degrees of freedom both theoretically and computationally.

**Changes compared to the last year** Minor changes in the lab work.

**Conclusions** The following conclusions are based upon the answers to the course avaluation form, chats with the students, and experiences from the homework evaluation. They have been discussed with the teaching assistents.

**General opinions**
- The course was considered to be interesting and meaningful.
- The course was considered to be quite difficult. In the beginning, it was estimated rather easy while later parts (especially on numerical methods) were really hard to understand.
- Most of the students thought that their prerequisites for the course have been sufficient.

**More detailed**
- The number of lectures spent to the three parts (linear algebra and optimization/dynamical systems/numerical methods) is not related to the complexity and pure amount of new contents. While the third part is rather short it is not well represented in the homeworks.

- The most important problem was the number and amount of work required in the homeworks. Most students indicate that they spent more than half of their study time to this course - a time mainly spent in doing homeworks.
- Occasionally, there is the feeling that the course focuses too much on mathematics while leaving applications alone.
- Interestingly enough, the interest in the different topics is equally distributed.
- The opinions on the exam problems are really splitted. Half of the students think that the exam reflected the course well while the other half has the opposite meaning.

**Possible actions**
- Change in schedule: The first part of the course is reduced in time thus leaving more room for the third part. This is motivated by the fact that thsi part is considered to be very easy and in part repeating other courses.
- Change in topics: The hardest and, unfortunately final, topic of the course are hyperbolic conservation laws and their discretization. Here, a reduction can be done. The motivation is that this rather complex topic is treated in detail in other courses. Instead, basics of perturbation analysis can be introduced.
- Definitely, the homeworks must be changed. The pure number of problems must be reduced. Moreover, the numerical part of the course must be better reflected. The recommended problems should include those which introduce to the examination.

**Teaching** In a usual fashion using lectures and lab work. Assignments: One assignment each week, from paper and pencil work to parameter studies of dynamical models in ecology and mechanics. Even partial differential equations were solved using Femlab.

**Examination** Written examination and computer labs

**Kurslitteratur**
- G. Strang: Applied mathematics, Wellesley-Cambridge, 1986
- Lecture notes, copies of OH-slides

**Prerequisites** No problem.

**Planned changes** A lot. See above