Mat-1.198 Scattering Theory (Sirontateoria)

Spring 2003 (4 credits)

- Lectures: Mon. 12-14 U345, Thu. 10-12 U345
- Exercises: Wed. 12-14 U322
- Lecturer: Prof. Erkki Somersalo, office hours Tue 10-12, room Y334
- Assistant: DI Kenrick Bingham, office hours Wed 14 o'clock or by appointment, room U320

The lectures start January 13th, 2003.

The lectures are held in English. The assistant is a native Finnish speaker despite his name.

Content

The course will focus on some central topics of scattering phenomena of acoustic and electromagnetic waves. These topics include

- **Forward scattering:**
  - Basic equations, different scatterers, radiation conditions
  - Fundamental solutions
  - Integral equations, representation formulas
  - Numerical aspects
  - Absorbing boundary conditions, Perfectly matched layers
- **Inverse scattering:**
  - Far field operators
  - Far field vs. near field data
  - Some uniqueness proofs
  - Numerical aspects

The exact contents of the course will find its form during the lectures. There is no single book that would cover all of the course, but the nearest approximations are

- David Colton, Rainer Kress: *Inverse Acoustic and Electromagnetic Scattering Theory.* Applied Mathematical Sciences 93, Springer-Verlag, 1992.
  (The second edition from 1998 will do quite as well.)
- David Colton, Rainer Kress: *Integral Equation Methods in Scattering Theory.* Wiley, 1983.

Other material will be distributed during the course.

Further Information

Further information about the course will be given on the course's web page at http://www.math.hut.fi/teaching/scat/ .

Some information may also be sent by e-mail to the students, so please sign up for the course and give your e-mail address, either on the first lecture or by sending e-mail to the assistant.

8 Jan 2003