

Topics in analysis
MWF 1:00-1:50pm
CB 242
Spring 2008

Instructor: Russell Brown
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Office hours: MW 11-12, F 2pm
and by appointment.

Text: The main text for this course will be lecture notes which are in preparation. The notes are available at the course home page,

<http://www.math.uky.edu/~rbrown/courses/ma773.s.08>

Goal: The goal of this course is to develop some of the basic tools in harmonic analysis and then show how these tools can be used to develop the scattering theory needed to solve the Davey-Stewartson equations by the method of inverse scattering.

Required work: Students will be expected to participate in the development of the material for the course. This may include the following activities.

- Attend regularly.
- Suggest at least four improvements to the lecture notes.
- Attend three colloquia or seminars and hand in a short summary of each talk attended.
- Deliver lectures.
- Read one paper related to the material in the course and give a talk based on part of the paper.
- Students who are not qualified PhD students may be asked to complete a few homework problems.

References:

- Beals, R. and Coifman, R.R.. The spectral problem for the Davey-Stewartson and Ishimori hierarchies. In: *Nonlinear evolution equations: Integrability and spectral methods*, pages 15–23. Manchester University Press, 1988.
- Brown, Russell, Lecture notes, on the course home page.
- Davey, A. and Stewartson, K., On three-dimensional packets of surface waves, *Proc. Roy. Soc. London Ser. A*, 338 (1974), 101–110.
- Nachman, Adrian I. and Ablowitz, Mark J., Multidimensional inverse scattering for first-order systems, *Stud. Appl. Math.*, 71 (1984), 251–262.

- Stein, Elias M. Singular integrals and differentiability properties of functions. Princeton Mathematical Series, No. 30 Princeton University Press, Princeton, N.J. 1970 xiv+290 pp.
- Stein, Elias M. (with the assistance of T. Murphy), Harmonic analysis: real-variable methods, orthogonality, and oscillatory integrals, Princeton Mathematical Series, 43, Princeton University Press, Princeton, NJ, 1993, xiv+695.
- Sung, Li-Yeng, An inverse scattering transform for the Davey-Stewartson II equations, I–III *J. Math. Anal. Appl.*, 1994.

Exams: There will be no examinations in this course.

January 8, 2008