MATH 672–001 (Wavelet Theory)
Fall 2003

Instructor: David Walnut

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Course Web Page: Access through `http://math.gmu.edu/html/courses/courses.html`

Office hours: TR 2:30pm–4:00pm and by appointment.

Text: D. Walnut, *An Introduction to Wavelet Analysis*, Birkhäuser Boston (2002). ISBN 0-8176-3962-4.

Prerequisites: Some knowledge of advanced calculus, and computer literacy (we will use MATLAB).

Topics: The goal of the course is to introduce the student to some of the basic concepts, constructions and applications of wavelet theory. Topics include:

- The Haar system (5.1-5.4)
- The Discrete Haar Transform (6.1-6.3)
- Intro to Fourier Series and Orthogonal Systems (2.1, 2.3)
- Intro to the Fourier Transform (3.1-3.5, 3.8, 4.3, 4.4)
- Multiresolution Analysis and Wavelet Bases (7.1-7.5)
- The Discrete Wavelet Transform (Filter Banks) (8.1-8.4)
- Vanishing Moments, Approximation, and Daubechies Wavelets (9.1-9.3)
- Biorthogonal Wavelets (10.4, 10.6, 10.7)
- Application: Image Compression (12.1-12.5)
- Application: The BCR Algorithm (13.2)
- Other Topics and Applications as Time Permits

Grading: The grade will be based on homework assignments, including some assignments using MATLAB, and on a semester project of the student's own choosing to be presented at the end of the semester. Details, deadlines and suggestions related to the semester project will be posted on the course webpage.