Stat/EE 530
Wavelets: Data Analysis, Algorithms and Theory

Don Percival, Instructor

http://faculty.washington.edu/dbp/s530/

• office hours: Mondays & Wednesdays, 11:00AM to 12:20PM in C–310, Padelford Hall (outside of Math Library)

• required text: Wavelet Methods for Time Series Analysis, co-authored with Andrew Walden, 2006
Tentative Schedule for Lectures: I

• introduction to wavelets (1 lecture; Chapter 1 of textbook)
• discrete wavelet transform (DWT) – overview (1 lecture; 2)
• Fourier and filtering theory (2 lectures; 3)
• DWT – theory (4 lectures; 4)
• maximal overlap DWT (MODWT) – theory (1 lectures; 5)
• Daubechies wavelet/scaling filters (2 lectures; 4 & 5)
• examples of DWT & MODWT analysis (3 lectures; 4 & 5)
• wavelet packet transforms & related topics (3 lectures; 6)
• wavelet variance – theory and applications (4 lectures; 8)
• wavelet-based signal extraction and denoising (4 lectures; 10)
Tentative Schedule for Lectures: II

- wavelet-based signal analysis and synthesis of processes with long range dependence (2 lectures; 9)
- time permitting, would also like to cover basics of
  - continuous wavelet transforms
  - wavelet-based image analysis (texture analysis in particular)
- note: lecture overheads can be downloaded from course Web site (PDF files in two formats)
Homework, Exams and Term Project

• seven homework assignments (30% of grade)
  – please check Web site for homework policy

• two closed-book exams, but ‘crib sheet’ allowed (30% of grade)
  – 30 minute exam on 29 April (10% of grade)
  – 50 minute exam on 27 May (20%)

• term project (40% of grade)
  – either data analysis, simulation study, methodological or theoretical study (or combination thereof)
  – written report (5 to 10 pages) due finals week (date pending)
  – if class size permits, oral presentation on 9 June (or possibly during last week of instruction)

• ‘Overview’ page on course Web site has details