

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 12:15PM 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 (3 lectures; 3)
- DWT – theory (5 lectures; 4)
- maximal overlap DWT (MODWT) – theory (1 lecture; 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 (1 lecture; 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 (40% of grade)
 - please check Web site for homework policy
- one 50 minute exam on 25 May (20% of grade)
 - closed book, but ‘crib sheet’ allowed
- term project (40% of grade)
 - either data analysis, simulation study, methodological or theoretical study (or combination thereof)
 - oral presentation on 7 June (or during final two classes)
 - written report (5 to 10 pages) due by 2PM on 8 June
- ‘Overview’ page on course Web site has details