MAT 240B Digital Audio Programming: Spectral Transformations (Winter, 2009)

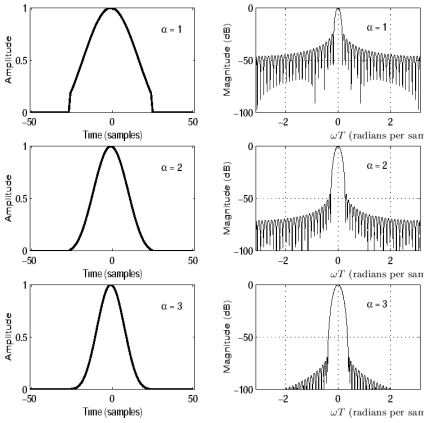
The MAT 240 sequence is a six-part (two-year) practical programming course; it consists of hands-on software development devoted to digital audio and multimedia development. Students read a selection of papers from the literature, with the emphasis on learning to use the current state-of-the-art programming methods, tools, and programming interfaces. Programming assignments involve C/C++/Java software development on Linux, Macintosh, MS-Windows, various plug-in architectures, and possibly other platforms.

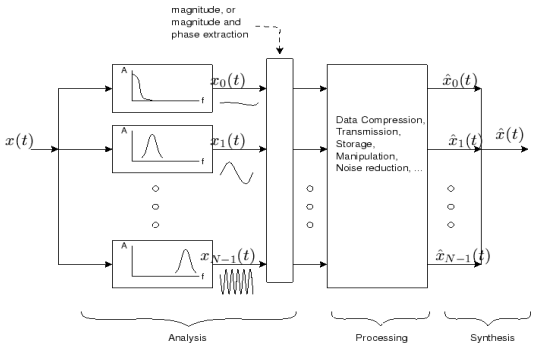
MAT240B focuses on the development of software for the spectral processing of digital sound. We will use several libraries for spectral analysis, processing, and resynthesis (e.g., FFT libraries and vocoder programs), as well as exploring digital filter design and other classes of spectral effects and transformations.

Students are expected to know the basics of digital audio signal representation and processing, and to be proficient in C, C++, or Java (Smalltalk, SuperCollider, LISP, and/or XML are a plus). Grading will be on the basis of in-class participation and programming projects.

Course Outline

- Time-domain and Frequency-domain Signals
- Transformations and Analysis/Synthesis Systems
- Fourier Analysis and the FFT
- FFT Software Libraries
- FFT-based Vocoders & Compression
- Digital Filters: Theory and Design
- FIR and IIR Filter Libraries
- Linear Prediction and LPC vocoders
- Pitch Detection and Analysis
- Applications





Instructor

- Stephen T. Pope

Meeting time and place

- Tuesday/Thursday 4 - 6 PM
- Music 2215 (CREATE)

Electronic Resources

- Course Web Site
  See http://www.create.ucsb.edu/240
- Email Mailing List
  Post to 240@mat.ucsb.edu