DIGITAL SIGNAL PROCESSING

Instructor: A. Spanias
Text: Andreas Spanias, Digital Signal Processing, An Interactive Approach, January 2007 (draft will be available).

Who should attend:
The course is designed for engineers, mathematicians, and programmers who need to understand the use of digital signal analysis in engineering applications and in particular in Communications and Multimedia systems. The course will be of particular interest to those involved in the design and implementation of DSP systems that need to gain knowledge on algorithms for filter design, the FFT, and signal analysis. Practical issues associated with real life signals, roundoff effects, etc are also discussed.

The course includes a series of Java-based exercises using the award winning Java-DSP package. The course also includes one MATLAB-based computer project that will provide an algorithm programming experience with real life signals.

Grading:
Homework : 10% - Homework is due during class on the day specified.
Lab Reports : 15% - Reports are due on the day specified.
2 tests each 15%
1 Computer Project 15%
Final: 30% - This will be a comprehensive exam.

Topics and Tentative Schedule:
1. 29/1/2007, 10.30-12.00, Intro to DSP (C. Pitris)
2. 5/2/2007, 10.30-12.00, Review of Linear Systems I (C. Pattichis)
3. 8/2/2007, 10.30-12.00, Review of Linear Systems II (C. Pattichis)
4. 20/2/2007, 10.30-13.30, Fourier Repres. - The Sampling Th. (A. Spanias)
5. 21/2/2007, 10.30-13.30, Intro to Multirate Systems (A. Spanias)
7. 23/2/2007, 10.30-13.30, The z-transform II (A. Spanias)
9. 15/3/2007, 10.30-12.00, Midterm 1 (A. Spanias)
10. 19/3/2007, 10.30-13.30, Linear Phase Filters (A. Spanias)
14. 26/3/2007, 10.30-12.00, Midterm 2 (A. Spanias)
15. 28/3/2007, 10.30-13.30, Linear and Circular Convolution (A. Spanias)
17. 30/3/2007, 10.30-13.30, Deterministic and Random signals (A. Spanias)
18. 23/4/2007, 10.30-12.00, Applications of DSP / Student Projects (Pattichis, Pitris)
19. 26/4/2007, 10.30-12.00, Applications of DSP / Student Projects (Pattichis, Pitris)
20. 30/4/2007, 10.30-12.00, Applications of DSP / Student Projects (Pattichis, Pitris)
21. 3/5/2007, 10.30-12.00, Applications of DSP / Student Projects (Pattichis, Pitris)

Java Computer Exercises:
The following computer exercises using the J-DSP software will be assigned
Z-transform and frequency response
Filter Design
FFT and its Applications
Multirate Signal Processing and QMF