

EE381K-14 Multidimensional Digital Signal Processing (Spring 2008)

Instructor: Prof. Brian L. Evans
Lecture Hours: TTH 11:00am–12:30pm, ENS 116
Office Hours: W 10–11am, TH 12:30–1:30pm, F 9-10am, and by appointment
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This course covers theory, algorithms, and design of image, video, seismic, beamforming, and other multidimensional signal processing systems. Applications covered include video conferencing, desktop printers, 3-D sonar beamforming, seismic surveys and 3-D medical imaging. Multidimensional signal processing has many surprises that do not appear in one dimension, e.g. sampling on non-rectangular grids, non-separable processing, and matrix-valued filter coefficients.

Prerequisites

(1) EE 381K-8 Digital Signal Processing, and (2) One of the following: EE 371R Digital Image and Video Processing, EE 380K System Theory, or EE 383P-1 Fourier Optics.

Topics

Multidimensional signals and systems, multidimensional discrete Fourier analysis, discrete cosine transform, two-dimensional filters, beamforming, seismic processing, tomography, multidimensional multirate systems, image halftoning, and video processing.

Required Textbook

Daniel E. Dudgeon and Russell M. Mersereau, *Multidimensional Digital Signal Processing*, Prentice-Hall, ISBN 0-13-604959-1, 1984. Out of print. To be distributed in class.
Alan C. Bovik, ed., *Handbook on Image and Video Processing*, 2nd ed., Academic Press, ISBN 0-12-119792-1, 2006.

Grading

10% Homework, 20% Test 1, 20% Test 2, 50% Project

Collaboration on solving homework problems is encouraged. Please be sure to submit your own independent homework solution. Late homework will not be accepted. For the project, you will submit a literature survey at mid-semester and a final report at semester's end. An oral presentation in class will precede each one. The project should be completed on an individual basis. There will be no final exam.

College Drop/Add Policy

An engineering student must have the Dean's approval to add or drop a course after the fourth class day of the semester.

Students with Disabilities

The University of Texas at Austin provides upon request appropriate academic accommodations for qualified students with disabilities. For more information, contact the Office of the Dean of Students at 471-6259, 471-4641 TTY or the College of Engineering Director of Students with Disabilities at 471-4382.