CHALMERS TEKNISKA HÖGSKOLA — KURSINFORMATION
Matematiska institutionen — 1999–09–30

TMA440 Fourier and wavelet analysis – Wavelets, TM4
läsperiod I, 1999/2000

This course develops the basic theory of wavelets and filter banks. Specifically, we describe the connection between filter banks and wavelets, and how to construct wavelets from filter banks. Basic applications of wavelets such as compression and denoising are discussed and implemented through computer exercises. The course provides an excellent opportunity for the engineering student to get acquainted with wavelets and to get started applying wavelet techniques to real world applications.

Contents: Filter banks, perfect reconstruction, multiresolution analysis, scaling function, wavelet, orthogonality and biorthogonality, approximation, compression, and denoising.

Text book: *Wavelets*, Bergh, Ekstedt, and Lindberg, Studentlitteratur 1999.

Prerequisites: Fourier analysis, basic signal processing and filter theory, elementary linear algebra.

Assignments: There will be two computer exercises.

Instructor:
Martin Lindberg, tel. 772 53 58, room 2218, `mlind@math.chalmers.se`.

Schedule: Tuesday 08.00–11.45
Thursday 13.15–17.00

28/9	Introduction (Ch. 1) 2h
30/9	Singal Processing (Ch. 2) 2h
	Filter banks (Ch. 3) 2h
5/10	Filter banks cont'd (Ch. 3) 2h
	Multiresolution analysis and wavelets (Ch. 4) 2h
7/10	MRA and wavelets cont'd (Ch. 4) 2-3h
	Wavelets in 2D (Ch. 5) 1-2h
12/10	Compression and Noise reduction (Ch. 10) 2h
	Adaptive Bases (Ch. 9) 2h
14/10	Summary of Course

Location: Room MD1 in Matematiskt Centrum.

First lecture: Tuesday September 28, 10 a.m.