

# Algorithms and Computation in Signal Processing

special topic course 18-799B

spring 2005

27<sup>th</sup> Lecture Apr. 19, 2005

Instructor: Markus Pueschel

TA: Srinivas Chellappa

# Miscellaneous

## ■ Online course evaluation

- Are open now
- Please complete

## ■ Research papers

(first version, only some experiments may be missing)

- Due tomorrow
- Send ps or pdf to me
- Final version due 1 week after your talk  
(hard deadline, otherwise I grade the first version)

# Research Project Presentations

## ■ Rules:

- **Send slides to me before class**
- PHD student + nonPhD student: **nonPhD student presents**
- Other pairings:  
the one who never gave an official presentation, otherwise it is up to you
- **20 minutes** (hard limit as in a conference)

# Schedule

## ■ Tuesday 26<sup>th</sup>:

- Woon Ho Jung
- Vijay Chandrasekhar/Bryan Chen
- Roland Wunderlich
- Sungchul Han/Suk Chan Kang

## ■ Thursday 28<sup>th</sup>:

- Eizan Miyamoto/Thomas Merryman
- Joohoon Lee/Dongkenn Lee
- John Cole
- Marek Telgarsky/Peter Milder

# Gauss Elimination and LU Factorization

Reference: Jim Demmel, "Applied Numerical Linear Algebra," SIAM 1997, pp. 38 and pp. 72

# Overview?

## ■ Gauss elimination:

- Given matrix  $A$ , vector  $b$
- Algorithm to solve a system of linear equations  $Ax = b$  for  $x$

## ■ LU factorization:

- Given matrix  $A$
- Factorize  $A=LU$ , where
- $L$  is lower triangular, ones on the diagonal
- $U$  is upper triangular

# Mostly Blackboard

- The relationship between Gauss elimination and LU factorization
- Inplace BLAS1/2 algorithm for LU factorization
- Cost analysis
- Blocking: BLAS3 algorithm for LU factorization
- Pivoting
- On the Complexity:  
MMM, matrix inverse, LU factorization, determinant