EE 7725: Interconnection Networks

Syllabus

When/How/URL

Monday Wednesday Friday 11:40–12:30 **Fall 1997**
Call Number 7077
http://www.ee.lsu.edu/koppel/ee7725

Who

David M. Koppelman
Room 349 Electrical Engineering Building, 388-5482, koppel@ee.lsu.edu
Tentative Office Hours: Monday, Thursday 14:00–16:30.

What

What do you do when the world's fastest CPU takes two days to compute the one-day weather forecast? You take ten CPU's and divide the problem between them, this is called parallel processing. The CPU's need to communicate while solving the problem; they do so using an interconnection network.

The course will describe a range of interconnection designs, concentrating on what are called multistage interconnection networks. Their use in message passing and shared memory issues will be covered; treatment ranges from theoretical foundations to implementation.

Topics

- Review of Parallel Processing
  - Communication in shared-memory and message-passing systems.
  - Parallel system models.
- Direct Networks: n-dimensional meshes and de-Bruijn families.
- MIN Basics: omega family topology and operation.
- Performance Analyses: analytic bounds, queuing models, simulation.
- Banyan and Delta Classes: topology, properties, admissible permutations.
- Fault-Tolerant and Multiple-Path Banyan-Like Networks
- Clos and Related Networks
- Generalized Connectors
- Sorting and Counting Networks.
- Congestion Reduction Techniques
- Shared Memory Topics (Time Permitting)

Texts

(Recommended, about 15% overlap with this course.) F. Thomas Leighton, "Introduction to parallel algorithms and architectures: arrays • trees • hypercubes."
Journal and Conference Papers

Grading

30% Midterm Exam • 30% Final Exam • 20% Project • 20% Homework

Late-homework and project penalty: 10% per day late deducted. Missed-midterm-exam policy: at instructor's discretion either a makeup exam, use final exam grade for midterm grade (*i.e.*, 60% final exam weight), or use of zero for midterm grade. Attendance: optional, however students are responsible for all material, instructions, and notices presented in class.