

Syllabus for MA 673

1.0 Types of Parallelism

(2 wks)

- 1.1 Vector pipelines
- 1.2 Attached processors
- 1.3 Multiprocessors

2.0 Parallel Problems and Amdahl's Law (3 wks)

- 2.1 Amdahl's Law
- 2.2 PI: mid-point rule for integration
- 2.3 Dot product
- 2.4 Mat-vec multiply
- 2.5 Tridiagonal solver
- 2.6 Gaussian elimination
- 2.7 SOR (successive overrelaxation)
- 2.8 Least squares
- 2.9 Preconditioned conjugate gradient (PCG)
- 2.10 Eigenvalues

3.0 Parallel Computers

(3 wks)

- 3.1 Illiac (iv), Eniac
Denelcor HEP
- 3.2 Alliant FX/8
- 3.3 Balance 2100
- 3.4 Butterfly
- 3.5 Intel hypercubes
- 3.6 Connection machines
- 3.7 FPS
- 3.8 IBM 3090
- 3.9 Crays
- 3.10 CDC (Cyber 205, ETA 10)

4.0 Portability

(2 wks)

- 4.1 Schedule
- 4.2 Monitors
- 4.3 Force

5.0 Applications

(2 wks)

- 5.1 Heat and mass transfer (Stefan problem)
- 5.2 Structural analysis (constrained optimization)
- 5.3 Fluid flow (explicit time discretization)