Table 4: Industrial HPCC Applications 1 to 5: SIMULATION

Item	Application Area and Examples	Problem Comments	Machine and Software
1 Sec. 4.3	**Computational Fluid Dynamics** • Aerospace • Military, Civilian Vehicles • Propulsion	• PDE, FEM • Turbulence • Mesh Generation	• SIMD, MIMD for irregular adaptive • HPF(+) but • Unclear for adaptive irregular mesh
2 Sec. 4.3	**Structural Dynamics**	• PDE, FEM • Dominated by Vendor Codes such as NASTRAN	• MIMD as complex geometry • HPF(+)
3 Sec. 4.2, 4.3	**Electromagnetic Simulation** • Antenna Design • Stealth Vehicles • Noise in high frequency circuits • Mobile Phones	• PDE solved by moment method • Matrix solve dominates	SIMD HPF
		• Newer FEM and FD Methods? • Also fast multipole	SIMD, MIMD HPF(+)
4 Sec. 4.1, 4.3	**Scheduling** • Manufacturing • Transportation (Dairy delivery to Military deployment) • University Classes • Airline Scheduling of crews, planes in static or dynamic (Syracuse snow storm) cases	Expert Systems and/or	MIMD (unclear Speedup) AsyncSoft
		Neural Networks Simulated annealing	SIMD HPF
		Linear Programming (hard sparse matrix)	MIMD HPF+?
5	**Environmental Modeling**— Earth/Ocean/Atmospheric Simulation	• PDE, FD, FEM • Sensitivity to Data	• SIMD but • MIMD for irregular adaptive mesh • HPF(+) except this unclear for adaptive irregular mesh