NSSC2 | Ex 1

Submission: Mon. 20th of April 2020

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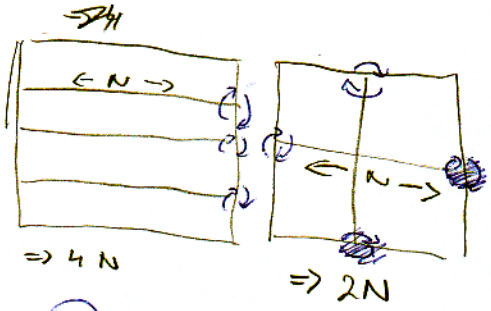
Task 1: Parallel Stencil-Based Jacobi Solver



Questions: First thoughts

(a) ~~2D~~ 2D vs 1D decomp

(+)

less ghost points (same # of subdomains) → less comms

more flexibility (esp. later with adaptive meshs)

less load on network during one stage of comms

(−)

~~more ghost points~~

more complex comm structure

more neighbouring domains

↳ delay in 1 domain affects more

more communication stages (1 vs 2), but less in each

b.) Only update ghost layer every couple of iterations

↳ assume values in ghost layer do not change much

(↳ maybe do warm up sweeps before with update every iteration)

↳ extrapolate change in values based on history (lin approx?)

c.) Hybrid (OpenMP + MPI) vs Pure (MPI)

Decouple subdomains

↳ subdomain ≙ subprog ≙ process ≙ node

↳ each subd: Solve with OMP-parallel Jacobi-Solver

Decouple subdomains

↳ subdomain ~~≙ thread~~

a.) subd ≙ thread

Either

b.) subd ≙ node/processor

↳ Solve with seq-Jacobi-Solver

d.) 2x compute node: