

CPSC 424 I HW 05

kd538 - Keyang Dong

Note

Script at `run.sh`.

Baseline Performance

0.4 +- 0.0 GFLOP/s

0. Baseline with O3 optimization

3.9 +- 0.0 GFLOP/s

1. Strength Reduction

10.3 +- 0.0 GFLOP/s

2. OpenMP Parallelization

80.2 +- 0.4 GFLOP/s

3. Data Structures and Vectorization

(N=16384)

Cores	GFLOP/s
1	13.4 +- 0.0
8	102.4 +- 0.1

N	GFLOP/s
2048	66.5 +- 4.9
4096	90.9 +- 0.5
8192	98.8 +- 0.3
16384	102.4 +- 0.1
32768	103.1 +- 0.7

4. Loop Unrolling (aka Tiling)

(N=16384)

tile_size	GFLOP/s
2	102.3 +- 0.5
4	93.2 +- 0.1
8	90.5 +- 0.1
16	87.1 +- 0.2

Seems tile_size=2 is best on Omega.

N	GFLOP/s
2048	67.1 +- 1.5
4096	90.9 +- 0.4
8192	98.9 +- 0.3
16384	102.7 +- 0.4
32768	103.9 +- 2.2

Performance with loop unrolling is almost the same with simply vectorized version.