

Chapter 1

Results

1.1 Sphere simulation

1.2 Methodology

1.2.1 Hardware

1.2.2 Benchmark setup

1.3 Optimizations

1.3.1 Numeric vs. Analytic Integration

1.3.2 Shared Memory

- No effect of the performance - Assemble System is not Compute Bound not Memory Bound. The transfer times are dwarfed by the compute time

1.3.3 Thread Block Dimension

1.4 Linear Solvers

1.5 Comparing CPU and GPU performance

1.6 Fortran vs. CUDA

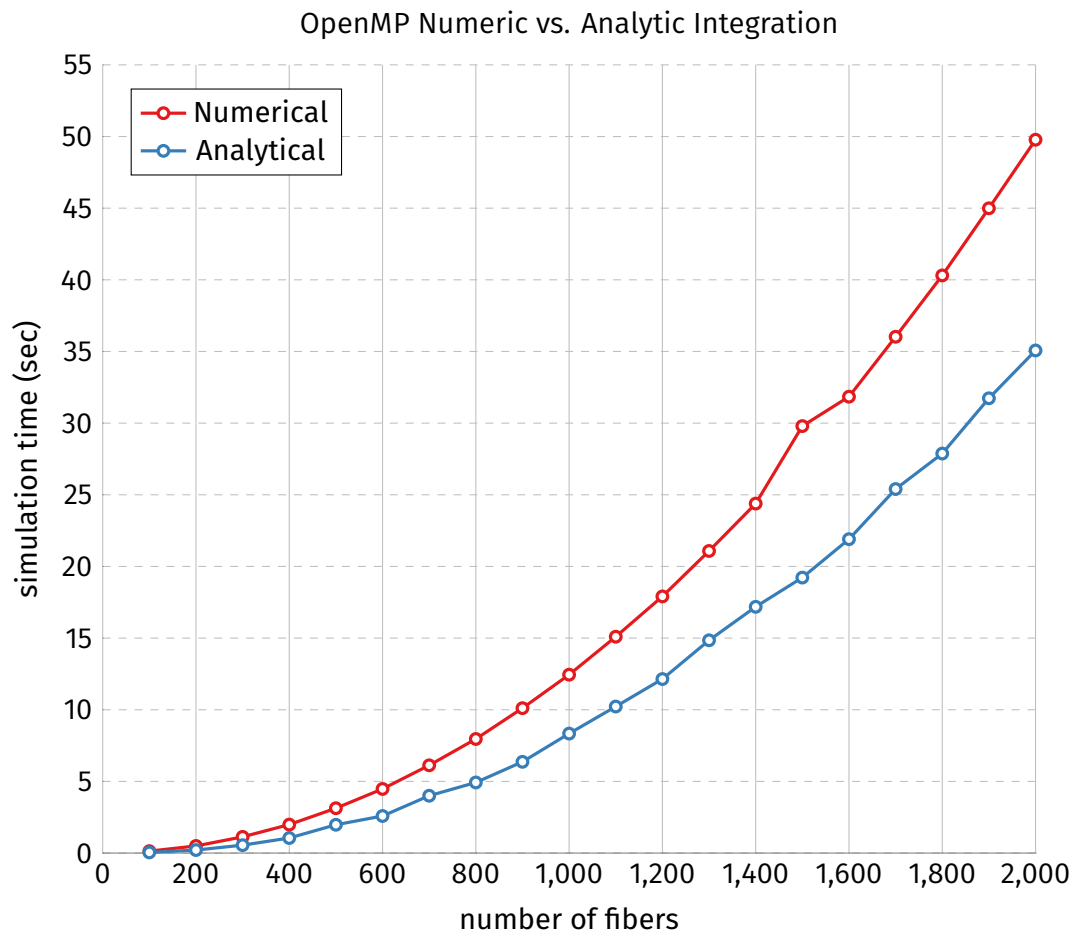


Figure 1.1: Benchmark of assemble system step for integration of inner integral.

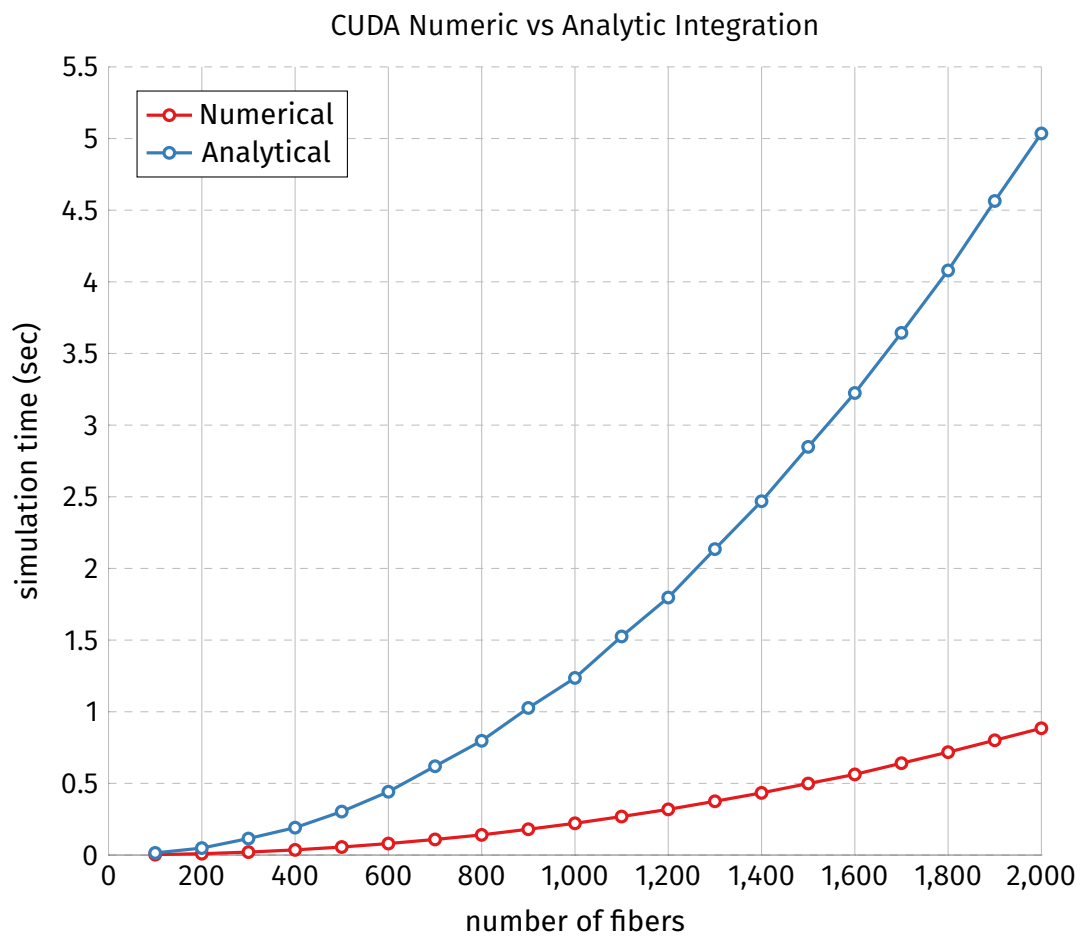


Figure 1.2: Benchmark of assemble system step for integration of inner integral.

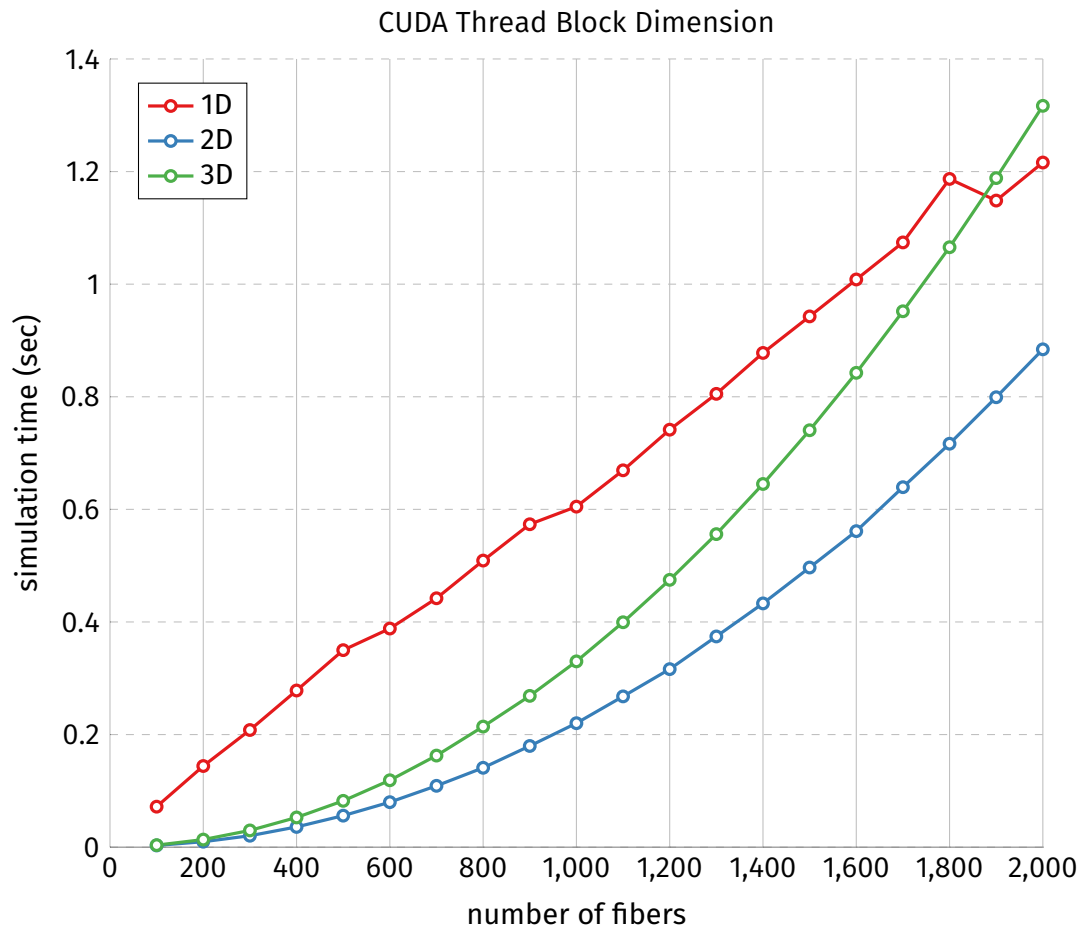


Figure 1.3: Benchmark of assemble system step for different thread block dimensions.

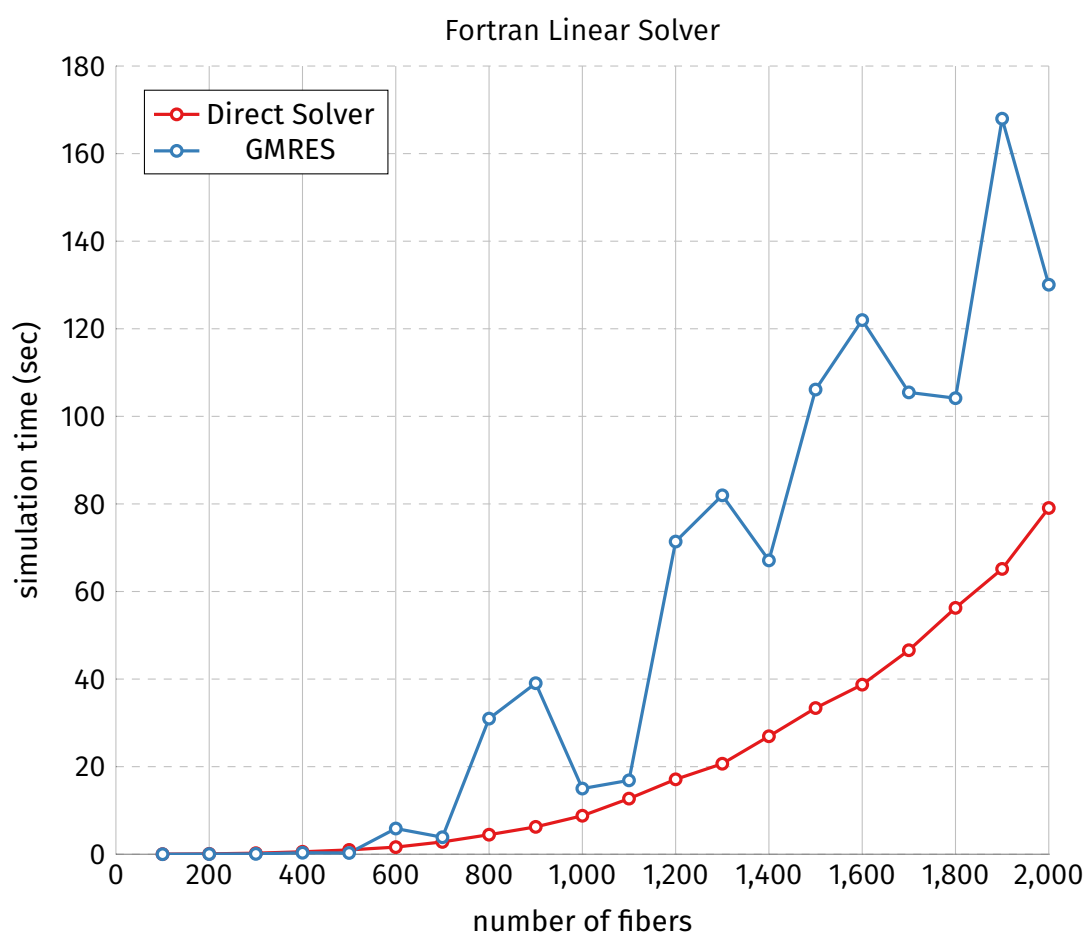


Figure 1.4: Benchmark of solve system step for different Fortran solvers.

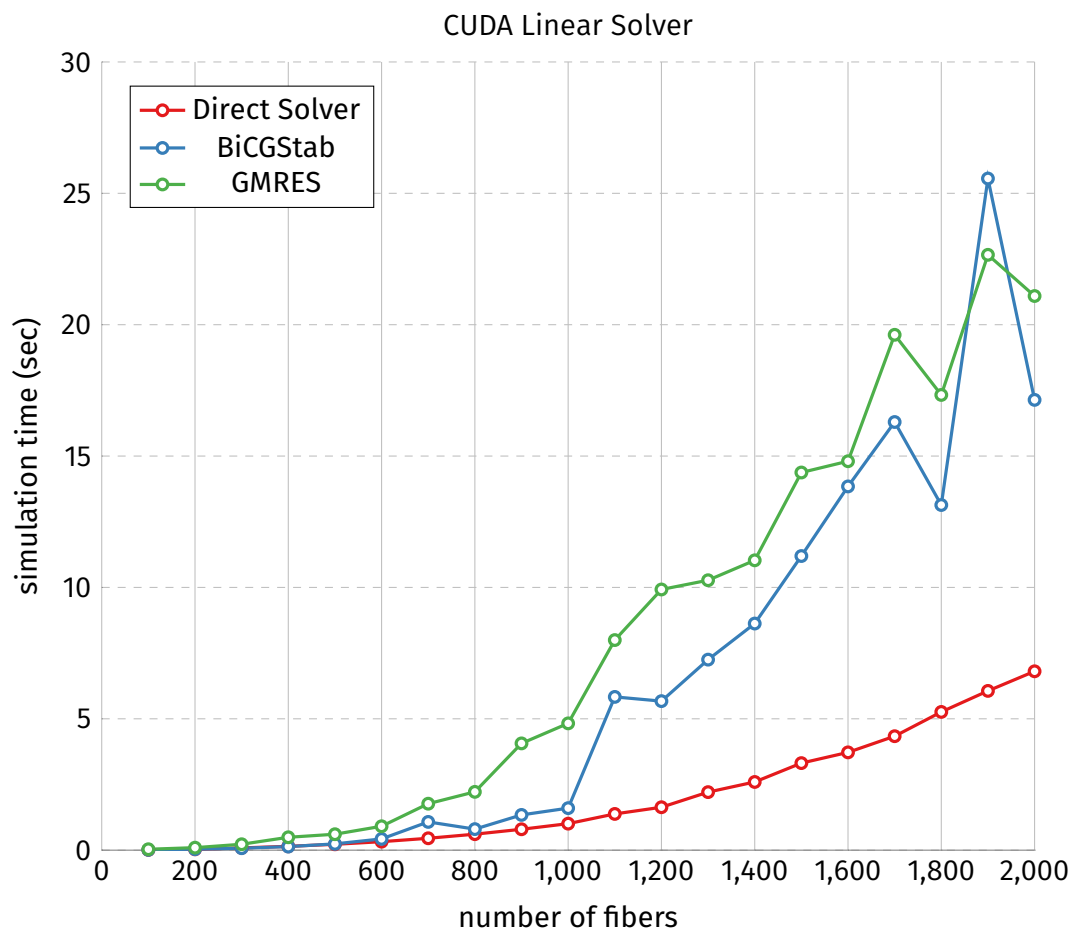


Figure 1.5: Benchmark of solve system step for different GPU linear solvers.

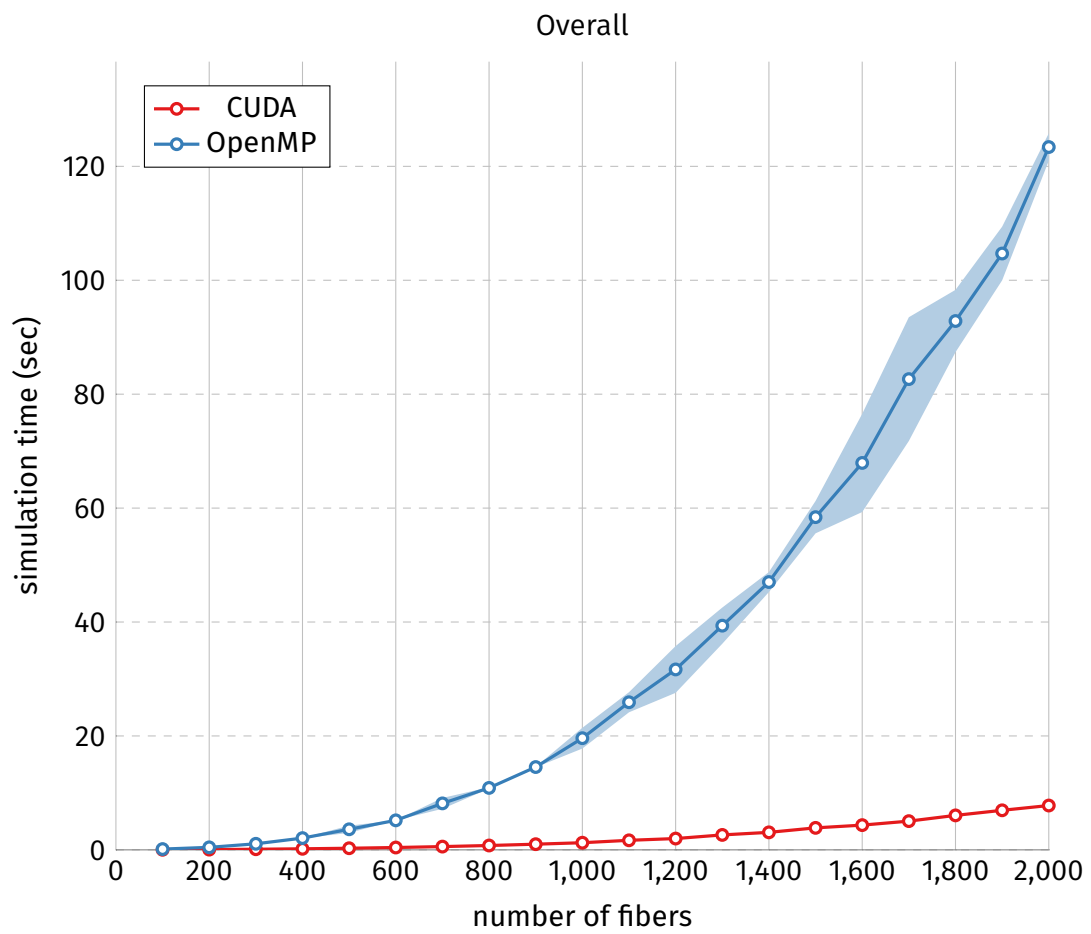


Figure 1.6: Benchmark of overall timestep for both OpenMP and CUDA.