GPU CLUSTER COMPUTING FOR MULTIGRID-FEM SOLVERS WITH APPLICATIONS IN CFD

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ABSTRACT

This presentation explores GPU acceleration of parallel multigrid solvers for Finite Element simulations on commodity based clusters. The integration, based on a mixed precision iterative refinement scheme, is minimally invasive in the sense that it requires no changes to application code: Hardware acceleration is completely encapsulated from the application level. We demonstrate good scalability and accurate results for the prototypical Poisson problem and applications in linearised elasticity and fluid dynamics. Finally, we derive a performance model to accurately estimate the achievable speed-up.

REFERENCES

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