Seminar

HPC Lab · CDS

Wednesday, January 18, 2023
4–5:30 p.m.
Room 1.03, RRZK
University of Cologne
Weyertal 121

Center for Data and Simulation Science

Speaker:

Dr. Alexander Heinlein

Delft University of Technology

FAST AND ROBUST OVERLAPPING SCHWARZ PRECONDITIONERS IN TRILINOS

HIGHLY SCALABLE ALGORITHMS AND THEIR EFFICIENT IMPLEMENTATION

The Trilinos library is an object-oriented software framework for the solution of large-scale, complex multi-physics engineering and scientific problems on new and emerging high-performance computing (HPC) architectures. It provides a collection of interoperable software packages enabling the development of algorithms reaching parallel scalability up to the largest supercomputers available.
This talk will discuss different aspects of Trilinos for the example of the FROSch (Fast and Robust Overlapping Schwarz) preconditioning framework, which is part of the Trilinos package ShyLU. FROSch implements multilevel Schwarz preconditioners, which are algebraic, i.e., which can be constructed using only the fully assembled parallel distributed system matrix. Making use of the software infrastructure of Trilinos, FROSch allows for the parallel solution of extremely large problems. Numerical results for various problems indicating parallel scalability up to more than 200,000 MPI ranks will be presented. Moreover, node-level parallelization on CPUs as well as GPUs using the Kokkos programming model through the Tpetra linear algebra framework will be discussed.

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