Lothar-Collatz-Seminar

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Update of Rank-Structured Preconditioners

Abstract:

In the simulation of fluid flow problems arise large-scale linear systems. Often, we have to solve repeatedly similar linear systems as in linearization methods, in adaptive grid refinement, or for local coefficient updates. This requires suitable preconditioning techniques and efficient update methods. In the first part of this talk, we discuss rank-structured matrix representations that reduce storage and computational costs. We focus on the concept of hierarchical ($\mathcal{H}$-) matrices and give a brief overview of the $\mathcal{H}$-LU factorization. In the second part, we will focus on a hierarchical algorithm for local factorization updates introduced by Liu, Xia, and de Hoop (2020). With this method, the factorization can be updated locally on subdomains. This is accomplished by precomputing some additional factors which can be reused in each update.

For further information please contact

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www.c3s.uni-hamburg.de/news-events/seminar-c3s.html