Numerical Analysis and Scientific Computing Seminar

Initial Guesses for Sequences of Linear Systems in a GPU-accelerated Incompressible Flow Solver

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Abstract: We revisit the projection method of Fischer for generating initial guesses when iteratively solving a sequence of linear systems, showing that it can be implemented efficiently in GPU-accelerated PDE solvers. We specifically consider such a solver for the incompressible Navier–Stokes equations and study the effectiveness of the method at reducing solver iteration counts. Additionally, we propose new methods for generating initial guesses based on stabilized polynomial extrapolation and show that they are generally competitive with projection methods while requiring only half the storage and performing considerably less data movement and communication. Our implementations of these algorithms are freely available as part of the libParanumal collection of GPU-accelerated flow solvers.

Friday, April 30, 2021, 1:30 pm
https://emory.zoom.us/j/95900585494

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