

## Talk announcement (ZOOM)

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15:30, via Zoom

## Matrix-free solvers for nonlinear problems

In this talk, we focus on the parallel solution of linear systems arising after discretization and linearization of nonlinear partial differential equations. We use a matrix-free approach to overcome the huge memory requirements of standard, sparse matrix based methods, in particular for high-order polynomial shape functions. We investigate why matrix-free methods can be superior in terms of actual performance compared to standard methods. Since the matrix itself is not available, geometric multigrid methods are one of the few viable options to solve these systems of equations. Numerical experiments illustrate the applicability and performance of matrix-free methods for challenging problems like fracture propagation. Furthermore, we present some recent developments and results towards matrix-free solvers for fluid-structure interaction.