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Poster 75: libCEED - Lightweight High-Order Finite Elements Library with Performance Portability and Extensibility

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Abstract: High-order numerical methods are widely used in PDE solvers, but software packages that have provided high-performance implementations have often been special-purpose and intrusive. libCEED is a new library that offers a purely algebraic interface for matrix-free operator representation and supports run-time selection of implementations tuned for a variety of computational device types, including CPUs and GPUs. We introduce the libCEED API and demonstrate how it can be used in standalone code or integrated with other packages (e.g., PETSc, MFEM, Nek5000) to solve examples of problems that often arise in the scientific computing community, ranging from fast solvers via geometric multigrid methods to Computational Fluid Dynamics (CFD) applications.

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