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MueLu: A Flexible, Parallel Multigrid Framework

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We have developed a flexible parallel multigrid framework called MueLu for developing and deploying multigrid algorithms. The framework is designed with a user-friendly front end, and so provides the standard complement of smoothers and direct solvers. Prolongator algorithms include smoothed aggregation and Petrov Galerkin methods, with plans to include others such as energy minimization. The design allows advanced users to customize almost any aspect of the multigrid solver, e.g., introducing new smoothers, alternative coarsening algorithms, specialized strength-of-connection measures, and even hybrids of different multigrid algorithms. MueLu leverages existing capabilities from Sandia's Trilinos project in order to manage issues such as parallelism and data types. In this talk we'll discuss the main design features, illustrate library usage with examples, and provide parallel examples.