

# Iterative Solvers Template Library (ISTL)

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**Abstract:** The numerical solution of partial differential equations (PDEs) frequently requires the efficient solution of large and sparse linear systems. While there are already several object oriented implementations of sparse linear algebra the iterative solvers template library (ISTL) was designed with advanced finite element methods in mind. The special structure of sparse matrices in finite element computations known at compile time is exploited for the efficient solution of the resulting linear equations using advanced C++ template programming techniques.

In the first part of the talk the design of and rationale behind the matrix and vector classes and the solver interface will be presented. It will be shown that the performance of ISTL is comparable to that of specialized C implementations.

In the second part the use of ISTL components as building blocks of parallel preconditioners for Krylow methods will be shown on the example of a parallel algebraic multigrid (AMG) method.

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