

A Generic C++ Framework for Parallel Mesh-Based Scientific Applications

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The objects that occur in scientific applications can be classified into spatial structures, e.g. meshes, grids, or graphs, and (numerical) data that are associated with these structures, e.g. grid functions and (sparse) matrices. Our C++ template library Janus rests on the observation that the spatial structures are conceptually more stable than the associated data. Janus provides a conceptual framework and generic components for mesh-based scientific applications. An outstanding feature of Janus is its unified treatment of regular and irregular structures. Our library has been developed using the paradigm of generic programming and is portably implemented on top of the Standard Template Library. It runs on top of MPI, but it can also be put onto other parallel platforms.