

An Algorithm for Information Storage in Parallel Adaptive Finite Element Computations

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Abstract: An algorithm for information storage that enhances efficiency in a parallel adaptive finite element computation is presented. The algorithm minimizes interprocessor communication which is an important consideration in every parallel adaptive solver. A scheme that keeps the level of node and edge for 2D and level of node and face for 3D instead of the complete history of refinements is utilized to facilitate derefinement. The information is local and exchange of information is minimized and also less memory is used. The parallel adaptive algorithms that run on distributed memory machines are implemented within femLego, a tool to solve partial differential equations using the finite element method. Problems in heat and mass transfer, materials science, and free boundaries, requiring the use of parallel adaptive computations are presented.

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