FM6S_12076

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

Dirichlet/Dirichlet and Neumann/Neumann Parallel Non-Overlapping Domain Decomposition Method

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The paper presents solution of two-dimensional Helmholtz equation using spectral non-overlapping domain decomposition method on parallel computer. The Chebyshev tau method was used for discretization of the sub-domain problems, and the diagonalization technique was used for solution of local system of equations. The novel feature of the paper consists of solution of the 2-D Helmholtz equation using the new iterative method. Efficiency of the method proposed was compared to the other iterative methods i.e. Zanolli as well as Louchart and Randriamampianina algorithms. It was shown that using the method proposed a smaller number of iterations was needed to obtain converged solution compared to the other iterative schemes if higher number of subdomains was considered. The improvement is mainly caused by solution of the common system of equations at the correction stage of the iterative process, which take into account the patching conditions at all interfaces.

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