Parsons, I. D.; **Hall, J. F.**
The multigrid method in solid mechanics. I: Algorithm description and behaviour. (English)
Zbl 0724.73269

Summary: A multigrid algorithm is described that can be used to obtain the finite element solution of linear elastic solid mechanics problems. The method is applied to some two-dimensional problems to evaluate its strenths and weaknesses. Extensive studies are made to determine the convergence behaviour of the method. In general, this depends on many factors: the number of degrees-of-freedom in the discretization, characteristics of the algorithm, Poisson's ratio when it is closed to $0 \cdot 5$, the amount of bending deformation in the problem under consideration, and the degree of nonuniformity in the mesh. Only certain values of the multigrid parameters allow a converged solution to be obtained with a computational effort proportional to the number of degrees-of-freedom. These values include the optimum ones, i.e. those that lead to convergence with the least computational effort. The constant of proportionality is only independent of the number of degrees-of-freedom and still depends on the other factors listed above.

MSC:

74S30	Other numerical methods in solid mechanics (MSC2010)
74S05	Finite element methods applied to problems in solid mechanics
65F10	Iterative numerical methods for linear systems

Cited in **1** Review
Cited in **19** Documents

Keywords:

linear elastic solid mechanics; two-dimensional problems; convergence behaviour

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