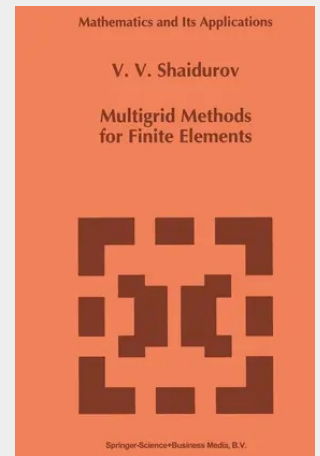


Multigrid Methods for Finite Elements

Multigrid Methods for Finite Elements combines two rapidly developing fields: finite element methods, and multigrid algorithms. At the theoretical level, Shaidurov justifies the rate of convergence of various multigrid algorithms for self-adjoint and non-self-adjoint problems, positive definite and indefinite problems, and singular and spectral problems. At the practical level these statements are carried over to detailed, concrete problems, including economical constructions of triangulations and effective work with curvilinear boundaries, quasilinear equations and systems. Great attention is given to mixed formulations of finite element methods, which allow the simplification of the approximation of the biharmonic equation, the steady-state Stokes, and Navier--Stokes problems.

1 Elliptic boundary-value problems and Bubnov-Galerkin method.- 2 General properties of finite elements.- 3 On the convergence of approximate solutions.- 4 General description of multigrid algorithms.- 5 Realization of the algorithms for second-order equations.- 6 Solving nonlinear problems and systems of equations.



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