Gunzburger, Max D.

Finite element methods for viscous incompressible flows. (English) Zbl 0697.76031
Computer Science and Scientific Computing. Boston, MA etc.: Academic Press. xvii, 269 p. $44.50 (1989).

A subtitle of the book is: "A guide to theory, practice, and algorithms". Thus the book is (intentionally) rather a guide-book through the large field of FEMs than a textbook, addressing primarily mathematicians. But also the engineer finds valuable hints. No examples are presented.

The first half of the book deals with the solution of the Navier-Stokes equations in primitive variables (mostly 2-D), the second half then deals with other forms (stream function etc.) and addresses some more general problems, e.g. viscoelastic or turbulent flow, electromagnetically or thermally coupled flow.

The author writes in the introduction: "A principal goal is to present some of the mathematical results that are relevant to practical computations". In this sense the book is an excellent guide and can be strongly recommended.

Reviewer: W.Schönauer

MSC:

76D05	Navier-Stokes equations for incompressible viscous fluids
65N30	Finite element, Rayleigh-Ritz and Galerkin methods for boundary value problems involving PDEs
76-02	Research exposition (monographs, survey articles) pertaining to fluid mechanics
65M60	Finite element, Rayleigh-Ritz and Galerkin methods for initial value and initial-boundary value problems involving PDEs
35Q30	Navier-Stokes equations

Keywords:

FEMs; Navier-Stokes equations in primitive variables; viscoelastic or turbulent flow; electromagnetically or thermally coupled flow