

Chapter 5 contains a section on finite elements for hyperbolic problems, which is a very active area of research, where rapid progress has been made in the last years, for example on problems in several dimensions and nonlinear problems. However, this development is not touched upon in the present book.

To sum up, I find the basic idea of the book to be very natural but I think it should be possible to give a presentation which would be more precise mathematically and more up-to-date numerically, without becoming more difficult to read.

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21[65–02, 76–02].—OLIVIER PIRONNEAU, *Méthodes des Éléments Finis pour les Fluides*, Collection Recherches en Mathématiques Appliquées, Vol. 7, Masson, Paris, 1988, 199 pp., 24 cm. Price FF 175.00.

This short monograph appears in a relatively new collection edited by P. G. Ciarlet and J.-L. Lions. Although the collection accepts texts in both French and English, most titles are in French. Such an outlet for high-quality research is especially welcome for Ph.D. level teaching where there is a definite lack of this kind of material. In this respect, the book by O. Pironneau is exemplary. It presents an excellent summary of classical problems of fluid mechanics, including a discussion of the physical limitations of models. It also presents a fairly large number of methods for convection-diffusion problems which are probably the most difficult ones in fluid simulation at high Reynolds number. The results are in no way complete, but they leave the reader with a real sense of what the issues are.

The treatment of incompressibility is well done, even if the repertoire of elements is a little short. There is a treatment of less standard boundary conditions, which can also be very useful for beginners; this kind of material is always very hard to find.

Navier-Stokes equations, both for incompressible and compressible flow, are considered. Again one should not look for complete results but for a broad picture sketching the main facts.

The book contains a collection of information which can nowhere else be found in one place. It should definitely be compulsory reading for beginners in flow simulation. Experienced readers will enjoy the practical presentation and will discover links between facts and methods they may not have thought about before.

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