

Oden, J. Tinsley; Kennon, S. R.; Tworzydło, W. W.; Bass, J. M.; Berry, C.
Progress on adaptive *hp*-finite element methods for the incompressible Navier-Stokes equations. (English) [Zbl 0771.76040](#)
Comput. Mech. 11, No. 5-6, 421-432 (1993).

This paper describes progress made toward the development of a general purpose CFD program that incorporates most of the new methodologies. The general approach is embodied in the code, P3/CFD, of PDA Engineering. Some special properties of this code should be noted.

MSC:

76M10 Finite element methods applied to problems in fluid mechanics
76D05 Navier-Stokes equations for incompressible viscous fluids

Cited in **2** Documents

Keywords:

three-dimensional problems; code P3/CFD

Full Text: [DOI](#)

References:

- [1] Ainsworth, M.; Oden, J. T. (1991 and to appear): A unified approach to a posteriori error estimation using element residual methods. TICOM report TR-91-4, Austin 1991 and, to appear, *Numer. Math.* · [Zbl 0797.65080](#)
- [2] Caretto, L. S.; Gosman, A. D.; Patanka, S. V.; Spalding, D. B. (1972): Two calculation procedures for steady, three-dimensional flows with recirculation. *Lecture Notes in Physics*, pp. 60-68. Berlin, Heidelberg, New York: Springer
- [3] Chorin, A. (1967): The numerical solution of the Navier-Stokes equations for an incompressible fluid. *Bull. Amer. Math. Soc.* 73/6, 928 · [Zbl 0168.46501](#) · [doi:10.1090/S0002-9904-1967-11853-6](#)
- [4] Demkowicz, L.; Oden, J. T.; Rachowicz, W.; Hardy, O. (1989): Toward a universal h-p adaptive finite element, part 1. Constrained approximation and data structures. *Comput. Meth. Appl. Mech. Eng.* 77, 79-112 · [Zbl 0723.73074](#) · [doi:10.1016/0045-7825\(89\)90129-1](#)
- [5] Gresho, P. M.; Chan, S. T. (1990): On the theory of semi-implicit projection methods for viscous incompressible flow and its implementation via a finite element method that introduces a nearly-consistent mass matrix. *Intern. J. Numer. Meth. Fluid* 11, 587-660 · [Zbl 0712.76035](#) · [doi:10.1002/flid.1650110509](#)
- [6] Gresho, P. M. (1991): Incompressible fluid dynamics: some fundamental issues. Lawrence Livermore National Laboratory Report UCRL-JC-104068, June. Also *Ann. Rev. Fluid Mech.* Vol 23 · [Zbl 0717.76006](#)
- [7] Oden, J. T.; Demkowicz, L.; Westermann, T. A.; Rachowicz, W. (1989): Toward a universal h-p adaptive finite element, part 2. A posteriori error estimates. *Comput. Meth. Appl. Mech. Eng.* 77, 113-180 · [Zbl 0723.73075](#) · [doi:10.1016/0045-7825\(89\)90130-8](#)
- [8] Oden, J. T.; Demkowicz, L.; Rachowicz, W.; Westermann, T. A. (1990): A posteriori error analysis in finite elements: the element residual method for symmetrizable problems with applications to compressible Euler and Navier-Stokes equations. In: Oden, J. T. (ed.): *Reliability in Computational Mechanics and Computer Methods in Applied Mechanics and Engineering*, 82, 1-3, 183-203 · [Zbl 0727.73072](#)
- [9] Patankar, W. V.; Spalding, D. B. (1972): A calculation procedure for heat, mass, and momentum transfer in three-dimensional parabolic flows. *Intern. J. Heat and Mass Transfer* 15, 1787-1806 · [Zbl 0246.76080](#) · [doi:10.1016/0017-9310\(72\)90054-3](#)
- [10] Rachowicz, W.; Oden, J. T.; Demkowicz, L. (1989): Toward a universal h-p adaptive finite element strategy, part 3. A study of the design of h-p meshes. *Comput. Meth. Appl. Mech. Eng.* 77, 181-212 · [Zbl 0723.73076](#) · [doi:10.1016/0045-7825\(89\)90131-X](#)
- [11] Ramaswamy, B.; Jue, T. C.; Akin, J. E. (to appear): A review of some finite element methods to solve the incompressible Navier-Stokes equations. *Comput. Meth. Appl. Mech. Eng.*
- [12] Tworzydło, W. W.; Oden, J. T. (to appear): Toward an automated environment in computational mechanics. *Comput. Meth. Appl. Mech. Eng.* · [Zbl 0772.73082](#)

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