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Computational methods for fluid flow, by Roger Peyret and Thomas D. Taylor, Springer Series in Computational Physics, Springer-Verlag, New York, 1983, x + 358 pp., $42.50. ISBN 0-3871-1147-6

I read this book by Peyret and Taylor with pleasure. At last there is an introductory book on computational fluid dynamics that is intelligent, fairly well informed and reasonably up-to-date. Its perspective is not, however, fully consistent with a mathematician's point of view.

Computational fluid dynamics (CFD) is the process of solving problems in fluid dynamics numerically on a computer. It was recognized long ago that the equations of fluid dynamics are particularly amenable to numerical solution, and as early as the 1920's L. Richardson tried to describe how this could be done. In [**18**] he imagined a gigantic concert hall full of hundreds of human "computers" passing pieces of calculations to each other under the majestic guidance of a conductor's baton. The invention of the nonhuman computer greatly streamlined the logistics and since the forties there has arisen an enormous CFD enterprise. There are thousands of researchers, innumerable applications, and an enormous literature; billions of dollars are spent every year on CFD calculations. These calculations have affected an amazing range of sciences—from astrophysics, geophysics, meteorology, biology, and chemistry, to most branches of engineering. Airplanes, space shuttles, weather forecasts, bombs and nuclear power plants are brought to you in part by CFD. Artificial hearts and energy producing devices are being added to this partial list. CFD is useful in all these fields because it supplements or even replaces experiments that are expensive, uninformative or, as in the case of astrophysics and meteorology, uncontrollable.

The equations of fluid dynamics are well known and their validity is not in doubt; one might think that, at least in principle, CFD is merely an elaborate exercise in numerical analysis and approximation theory. However, the phenomena of fluid mechanics (turbulence, combustion, multidimensional shock patterns, boundary layers, etc.) are so complicated that with present methods many of them could not be fully analyzed on any finite computer. As a result, CFD has acquired a life of its own as a major research area—one in which mathematics, physical intuition and computer science interact in original and unexpected ways. Those who are not familiar with fluid mechanics can see