

Spectral methods in fluid dynamics

Springer-Verlag - Spectral Methods in Fluid Dynamics



Description: -

- Fluid dynamics.

Numerical analysis.

Differential equations, Partial -- Numerical solutions. Spectral methods in fluid dynamics

- Springer series in computational physics Spectral methods in fluid dynamics

Notes: Includes bibliographical references (p. [529]-559) and index.
This edition was published in 1988



Filesize: 24.108 MB

Tags: #Fundamentals #of #Spectral #Methods #for #PDEs

Spectral Methods in Fluid Dynamics

Once these two criteria are established, the power of computing machines can be leveraged to solve the problem in a numerically reliable fashion. In SEM computational error decreases exponentially as the order of approximating polynomial, therefore a fast convergence of solution to the exact solution is realized with fewer degrees of freedom of the structure in comparison with FEM.

Spectral Methods

Spectral Accuracy for a Two-Dimensional Fluid Calculation -- 1. Fundamentals of Iterative Methods -- 5. Although the theory does not yet cover the complete spectrum of applications, the analytical techniques which have been developed in recent years have facilitated the examination of an increasing number of problems of practical interest.

Numerical methods in fluid mechanics

Comparisons are made with experiment and previous numerical work. Some recent developments stressed in the book are iterative techniques including the spectral multigrid method , spectral shock-fitting algorithms, and spectral multidomain methods. The problem becomes one of defining the error measure which is a complicated task in general situations.

Spectral element method

All of the essential components of spectral algorithms currently employed for large-scale computations in fluid mechanics are described in detail. Their convergence is a consequence of

Spectral element method

Global methods are preferable to local methods when the solution varies considerably in time or space, when very high spatial resolution is required, and also when long time integration is needed. It is not clear if this is possible! Along with finite differences and finite elements, spectral methods are one of the three main methodologies for solving partial differential equations on computers.

A Direct Spectral Method for Determination of Flows over Corrugated Boundaries

The success of spectral methods in practical computations has led to an increasing interest in their theoretical aspects, especially since the mid-1970s. With this combination, simplifications result such that mass lumping occurs at all nodes and a collocation procedure results at interior points.

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SIAM Journal on 26 1989 pp. The third part is devoted to some recent developments of spectral methods, such as mixed spectral methods, combined spectral methods and spectral methods on the surface. The Poisson Equation -- 11.

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