

Lattice-Boltzmann Methods for Internal Flows

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Reviews

This pdf might be well worth a study, and a lot better than other. It really is simplistic but excitement inside the fifty percent in the book. Its been printed in an exceedingly straightforward way which is just after i finished reading this ebook through which really modified me, modify the way i believe. (Derick Brekke)

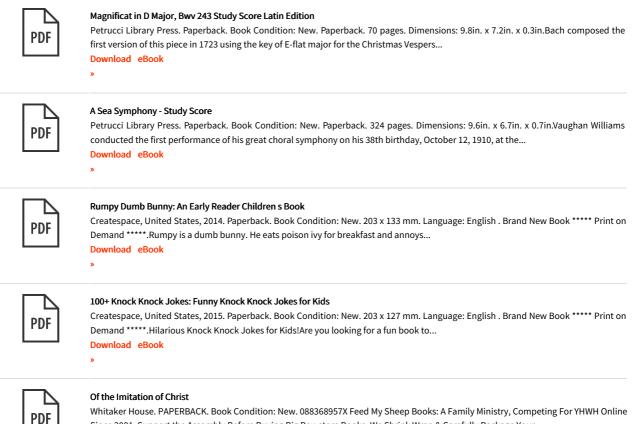
LATTICE-BOLTZMANN METHODS FOR INTERNAL FLOWS



Shaker Verlag Jul 2008, 2008. Taschenbuch. Condition: Neu. Neuware - The Lattice-Boltzmann method (LBM), although already established as a new tool in Computational Fluid Dynamics (CFD), is still increasingly gaining attention by the scientific community and in the field of industrial research. Several new approaches have been proposed to widen the field of applicability of the method and to overcome the deficiencies of the first LBM from the early 90's. Compared to the numerous new approaches that are suggested, there's a releatively thin base of validation and stability analysis for the method, especially in the field of turbulence simulation. Furthermore, the application and implementation of boundary and initial conditions is still a field of ongoing research and discussion. In this work the classical Bhatnagar-Gross-Krook (BGK) LBM and two newer approaches are analyzed for the simulation of a turbulent channel flow and compared in terms of stability and physical meaningfulness. Furthermore, the applicability of a grid refinement technique is investigated for the turbulent flow. In the second part of this work a grid generation algorithm is presented and the parallelization of a LBM solver for massive parallel processing is discussed. The developed methods are then applied for the simulation of the airflow through a human lung cast at steady inspiration and expiration. The findings of the simulation are discussed and compared to experimental results. From these findings it is concluded that the LBM is suitable method for the investigation of the airflow in the respiratory system with special advantages in terms of the grid generation process, the efficient treatment of complex geometries and the low computation time. 124 pp. Englisch.

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