

The Lattice Boltzmann Equation: Model and Associated Numerical Approaches

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Abstract

The lattice Boltzmann Equation models flow in the kinetic framework. Upscaling the equation, one obtains fluid flow models such as the incompressible Navier-Stokes equation in the limit of the small Knudsen or Mach number. Hence the lattice Boltzmann Equations can be used to derive numerical schemes for fluid flow models. In this presentation, we consider the lattice Boltzmann method (LBM) which is a direct discretisation of the lattice Boltzmann equation as well as relaxation schemes derived from relaxation systems based on Lattice Boltzmann equations. Analytical as well as numerical aspects and application examples will also be presented.