

Introduction to the analysis of lattice Boltzmann schemes

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27 August 2014 *

In this communication, we follow a step by step approach in order to familiarize the beginner with the analysis of multirelaxation lattice Boltzmann schemes. We begin with a one dimensional case and present an asymptotic analysis of the D1Q3 lattice Boltzmann scheme for acoustics and thermal applications. Then we propose a general nonlinear method for the analysis of an arbitrary scheme at second order accuracy. After this, we present the so-called “Berlin algorithm” able to explicit the equivalent partial differential equations of an arbitrary linear lattice Boltzmann scheme at any order of accuracy.

* Contribution to “Mathias”, La Defense, 29-31 october 2014.