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ADVANCES IN LATTICE BOLTZMANN (LBM) AND KINETIC SCHEMES
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ABSTRACT

The concept of LBM goes back to R. Gatignol and H. Cabanes in the early 70's, and has been popularised by Frish, d'Humières, Pommeau, Hasslacher, Lallemand and Rivet with the concept of Cellular automa. It evolved towards its current formulations, thanks to numerical interpretations of the Boltzmann equations. It has mostly been used for low Mach number flows, and the extension to compressible flows with is a timely research topics, since several families of LB methods (regularized methods, cascaded or cumulant-based methods, entropic methods) have been extended to such flows. This simplicity of the method explains its popularity both in academia and industry. Another interpretation of the BGK equation is given by Shi Jin in which the physical interpretation is forgotten. The question is: given an hyperbolic (or parabolic) system, how can we formally approximate it by a BGK type system? The stability constraints are formalised via the Whittam sub-characteristc condition. On a different, but related line of work, one can consider the work of K. Xu and collaborators, where finite volume type numerical methods are constructed directly form the BGK approximation.

The aim of this minisymposium is to gather some actors of each of these communities, and exchange experience and progresses in the numerical methods.A partial list of speakers is L.-S. Luo (Old Dominion), P. Dellar (Oxford), K. Xu (Hong-Kong), R. Natalini (Roma) and researchers from the industry.