Numerical study to improve the numerical instability of lattice Boltzmann method

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The numerical stability behavior of the original lattice Boltzmann method deteriorates as Reynolds number increases, so the application of lattice Boltzmann method is traditionally limited to low Reynolds numbers. Although, to a certain extent, this dilemma could be released through the technology of grid refinement, it is not practical to merely refine the grid, especially, when dealing with problems with a complex geometry or relatively high Reynolds numbers. Two improved lattice Boltzmann methods are applied in this paper, known as multiple relaxation time lattice Boltzmann method and large eddy simulation lattice Boltzmann method, both of these methods have largely improved the stability behavior of LBM. Some numerical cases are studied including, lid-driven cavity, bottom surface mounted square and flow around blunt bodies. Some results of the simulations performed are presented.

Biography
Bo AN has completed his Master’s degrees from Northwestern Polytechnical University School of Aeronautics in 2013 and Universidad Politécnica de Madrid School of Aeronautics in 2015. Now he is a PhD student of Universitat Politècnica de Catalunya, BarcelonaTech. His major is Computational Fluid Dynamics. He used to study ice accretion on airfoil, lattice Boltzmann method and traditional computational methods.

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