A Comparison of Multiphase LBGK and MRT LBE Models YAN
PENG, LI-SHI LUO, Old Dominion University — One undesirable feature of LBE
methods as diffuse interface methods is the existence of parasitic currents. Recently,
Lee and Fischer have shown that if the potential form of the intermolecular force is
used, the parasitic currents can be eliminated. In their study, the LBGK collision
model is used. As we know that multiple-relaxation-time (MRT) collision model has
a number of advantages over the lattice Bhatnagar-Gross-Krook (LBGK) model.
In this study, we will replace the LBGK with MRT collision model. We compared
the stability and Galilean invariance of the two models. The test case is a circular
bubble. We found that LBGK is very sensitive to the initial given density values.
For the Galilean invariance property, we first get the converged equilibrium solution.
Then we add an external velocity. We found that LBGK scheme diverges even a
very small velocity is given. From these comparisons, we conclude that MRT is more
stable and preserve Galilean invariance better than LBGK.

Li-Shi Luo
Old Dominion University