A numerical study of the rheology of flexible fiber suspensions

Haibo Huang

Department of Modern Mechanics, University of Science and Technology of China,
Hefei, Anhui 230026, China

Abstract

Non-Brownian Flexible fiber suspensions in Newtonian simple shear flow is studied using immersed boundary (IB) method. The deformation and movement of the fiber and the fluid flow are solved by the finite element method (FEM) and the lattice Boltzmann method (LBM), respectively. The FEM and LBM are coupled by the IB method. The effects of fiber stiffness, length on the relative viscosity of fiber suspensions are investigated. The primary normal stress difference as a function of the fiber's stiffness is also investigated.