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**Modeling of motion of flexible fibers in nonzero Reynolds number flows** DEWEI QI, Western Michigan University — Based on a lattice Boltzmann equation, methods for direct simulations of flexible filament suspensions in a nonzero Reynolds number flow are developed. A flexible fiber is discretised into a chain of either consecutive spherical or cylindrical segments. For spherical model, a constraint force algorithm is proposed to warrant constant bonding distance and non-slip contacting velocity between two neighboring segments so that the filament moves and rotates as a whole body. For cylindrical model, cylindrical segments move and rotate with additional constraint forces that keep the joint point between two neighboring segment have the same displacement. A constraint algorithm for rotations of cylindrical segment is developed. The present flexible fiber methods are tested by using a rigid particle method at large fiber stiffness and by comparing the present results with theoretical and experimental results. It is demonstrated that the present results have a reasonable accuracy and that the computational results are consistent with the existed experimental results at nonzero Reynolds number flows. The behavior of flexible fibers in shearing and sedimentation flows is studied and reported.

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