

Abstract Submitted  
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**A new 3D immersed boundary method for non-Newtonian fluid-structure-interaction with application**<sup>1</sup> LUODING ZHU, Indiana U -Purdue U Indianapolis — Motivated by fluid-structure-interaction (FSI) phenomena in life sciences (e.g., motions of sperm and cytoskeleton in complex fluids), we introduce a new immersed boundary method for FSI problems involving non-Newtonian fluids in three dimensions. The non-Newtonian fluids are modelled by the FENE-P model (including the Oldroyd-B model as an especial case) and numerically solved by a lattice Boltzmann scheme (the D3Q7 model). The fluid flow is modelled by the lattice Boltzmann equations and numerically solved by the D3Q19 model. The deformable structure and the fluid-structure-interaction are handled by the immersed boundary method. As an application, we study a FSI toy problem — interaction of an elastic plate (flapped at its leading edge and restricted nowhere else) with a non-Newtonian fluid in a 3D flow.

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