Computational flow dynamics of complex fluids

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LAP Lambert Acad. Publ. Mrz 2011, 2011. Taschenbuch. Condition: Neu. Neuware - In this work several multiphase flow problems with complex boundaries are numerically analyzed: The long-time diffusion coefficient and flow transition in the shear flow of inelastic, rough, hard granular spheres is analyzed by molecular dynamics simulations. Two-phase lattice-Boltzmann method is verified for modelling of the capillary rise Phenomenon and analyzed for related parameters such as dynamic contact angle and the capillary number. The lattice-Boltzmann code is also used to analyze the rheology of liquid-particle suspensions; the dependence of the viscosity of the suspension on the concentration of particles and shear rate in a Couette flow geometry. Finally the low Reynolds number channel flow of liquid-particle suspensions is studied, in which suspended particles that can attach on channel walls or detached. Phase transitions are observed such as first order like transition to a meandering phase. The meandering phase is followed by a necking phase and finally a transition to a fully blocked flow channel takes place. A well known phenomenon is the formation of blood cholesterol clogs in heart coronary arteries that can lead to heart attack (myocardial infarction). 84 pp. Englisch.

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