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Lattice Boltzmann simulation of non-Newtonian flows past confined cylinders. (English)

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Summary: A second-order lattice Boltzmann algorithm is used for Power-Law non-Newtonian flow simulation. The shear dependent behavior of the fluid is implemented through calculating the shear locally from the lattice distribution functions. A step by step verification procedure is taken to ensure the accuracy and the physical correctness of the numerical simulation. The flow past a series of tandem arrangement of two cylinders is computed in a confined domain. The effects of Reynolds number, the Power-Law index, and the distance between two cylinders on both the flow field and the drag coefficients of the cylinders are examined in detail.

MSC:

76A05 Non-Newtonian fluids

76M28 Particle methods and lattice-gas methods

Cited in **3** Documents

Keywords:

lattice Boltzmann method; non-Newtonian fluids; power-law fluid; confined flow; tandem cylinders; drag coefficient

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