عنوان مقاله:

Low Reynolds number flow of non-Newtonian fluids over oscillating cylinders

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خلاصه مقاله:

In this study low Reynolds number non-Newtonian fluid flow around a transversely oscillating cylinder is investigated. Flow around circular cylinder is one of the genuine subjects of fluid mechanics and there are many applications such as Vortex Induced Vibration. Inpresent study power law model has been used to represent non-Newtonian fluid viscosity. The simulation of non-Newtonian fluids passing transversely oscillating cylinder were conducted. The Reynolds number is considered to be 20 and cylinder is oscillated withfrequencies 0.1, 0.2 and 0.4 the amplitudes of oscillations are 0.1, 0.2, 0.4 of cylinder radius. The drag coefficient and pressure counters are investigated for two shear thickening (dilatants) and shear thinning (pseudoplastic) non-Newtonian fluids in variousfrequencies and amplitudes. The results indicate that by increasing the frequency of oscillations, there is an increase in drag coefficient of pseudoplastic fluids but for dilatant fluids the drag coefficient decreases with oscillation frequency increase which is significant inlarge amplitudes and ignorable in small oscillation amplitudes.

کلمات کلیدی:

non-Newtonian fluid, Oscillating cylinder, OpenFOAM, Power law model

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