TIME FRACTIONAL OSEEN PROBLEM FOR VISCOUS FLUIDS *

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Dedicated to Professor Mihail Megan
on the occasion of his 70th anniversary

Abstract

Time fractional Oseen problem is analytically solved for viscous fluids. Exact solutions are obtained for the dimensionless velocity field and the corresponding non-trivial shear stress and circulation. These solutions, as it was to be expected, reduce to the non-dimensional forms of classical solutions when the fractional parameter tends to one. The decay of potential vortex and the diffusion of vorticity under the influence of fractional parameter are graphically underlined and discussed. The power of vortex as well as the diffusion of vorticity are stronger for fractional in comparison to ordinary fluids. In all cases the vortex decreases in time and space.

MSC: 76A05

keywords: viscous fluid, potential vortex, fractional model.