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MESOSCOPIC RHEOLOGICAL MODEL FOR POLYMERIC FLUIDS AND SOME EXAMPLES OF FLOWS

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Rheological model has been received as zero approach on the available small parametres connected with internal viscosity and environment, and is model Pokrovskii - Vinogradov generalisation. This model used for numerical research of polymer behaviour in difficult conditions of their deformation which are characteristic for technological processes of processing. On the basis of rheological model received have been numerically investigated stationary viscometric functions: the viscosity, the first and second differences of normal stresses at simple shear and elongation viscosity. The relation of elongation viscosity to shear viscosity has been found as function of the first invariant additional stresses tensor. Have been calculated flow in a round pipe that has allowed specify amendments to the law of Poiseuille, and cylinders with a rotating end face and a free surface that has given the chance to describe distinctions of movement Newtonian and polymeric fluids. Also influence of molecular weight on shift and longitudinal viscosity was investigated. We will notice that if to satisfy to a condition of independence of asymptotic behaviour of shift viscosity from molecular weight it is possible to receive communication between entered in the equations of dynamics of a macromolecule in parametres of anisotropy. Also in work the problem about cooling and a stretching of a film after an exit from extruder is considered. For this purpose it is necessary to add the equation of conservation of energy to the equations of dynamics of the continuous environment and to consider temperature dependence of factor of initial viscosity and initial time of a relaxation. Thus it was possible to calculate distribution of temperature, a velocity profile and making stress tensor dependence on factors of heat exchange and heat conductivity for various types of boundary conditions. The received results do not contradict observed on practice. The received results do not contradict observed on practice.