

ON CORRECTNESS OF THE CAUCHY PROBLEM FOR TWO-VELOCITY TWO-PHASE VISCOUS FLOW

R. R. Tikhvatullina

M. V. Lomonosov Moscow State University, 1-52 Leninskiye Gory, GSP-1, Moscow 119991, Russian Federation

Abstract: Correctness of the Cauchy problem for three-dimensional Navier–Stokes equations is studied. Two-velocity two-phase (liquid–gas) flow model with common pressure is considered. Flow model is also assumed to be isothermal and incompressible in liquid phase. It is shown that introduction of viscous stress — consideration of the Navier–Stokes model instead of the Euler model — makes the Cauchy problem with constant initial conditions well-posed, contrary to the case of the Euler model. Generally, incorrectness of the Euler equations for this model is considered as a consequence of incomplete description of interfacial interactions. An approach to the Euler equations regularization, which does not involve introduction of interfacial or dispersed particles interaction into the model, is presented.

Keywords: ill-posed problems; regularization; two-phase flows; Navier–Stokes equations

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Contributor

Tikhvatullina Ruzana R. (b. 1988) — postgraduate student, M. V. Lomonosov Moscow State University, 1-52 Leninskiye Gory, GSP-1, Moscow 119991, Russian Federation; tikhvatullinarr@gmail.com