

Description of a New Generalized Quasi Two-Phase Mass Flow Model

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Employing the full dimensional two-phase (mixture of solid particles and viscous fluid) mass flow model equations [1], we have generated a novel, generalized quasi two-phase, full two-dimensional model for bulk mixture flow down a channel. The emerging model is written as a well-structured system of three highly non-linear partial differential equations in conservative form representing the mass and the momentum balances. The new mechanical and dynamical concepts of generalized bulk and shear viscosities, pressures, and velocities for the mixture characterize the model. Some new reduced models are also obtained by considering different aspects of dynamics and modeling. The advantage of the model lies mainly in providing a possibility for simulating the mixture velocities and pressures much faster than the two-phase mass flow model. Furthermore, the introduction of the velocity and pressure drifts factors makes it possible to reconstruct the two-phase mass flow so as to capture its basic dynamics.

Keywords: Quasi-two-phase flow, generalized bulk and shear viscosities, Generalized mixture velocities and pressure, Velocity and pressure drift factors

References

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