A three-phase flow model with two miscible phases

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This work is devoted to the modelling of a compressible mixture of a liquid, its vapor and a gas. The gas and the vapor are miscible while the liquid is immiscible with the gaseous phases. This assumption leads to non symmetric constraints on the void fractions. We derive a three-phase three-pressure model endowed with an entropic structure, in the spirit of [2]. We show that interfacial pressures are uniquely defined and propose entropy-consistent closure laws for the source terms. Naturally one exhibits that the mechanical relaxation complies with Dalton's law on the phasic pressures [1]. Then the hyperbolicity and the eigenstructure of the homogeneous model are investigated and, following [3], we prove that it admits a symmetric form leading to a local existence result.

Références

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