Dedicated to Professor LAZĂR DRAGOŞ on his 75th birthday

A Comparative Study of Non-Fickean Diffusion in Binary Fluids

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December 20, 2005

Abstract - We consider a non-Fickean diffusion model for binary mixtures. Here, the flux is not governed by Fick's law, it is governed by an evolution equation, derived from the partial balance momenta under the hypothesis of "small" diffusion velocities. We apply this model to a binary non-reactive mixture with zero average velocity at thermal equilibrium. In particular, Fick's model is recovered as a first order perturbation of the non-Fickean model.

Key words and phrases : diffusion models, hyperbolic PDE, parabolic PDE, asymptotic limit.

Mathematics Subject Classification (2000) **:** 76A05, 76D33, 76A99.