

Degenerate Einstein Equation of Brownian Motion with Drift and Absorption in Multidimensional Domain

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Abstract

We considered generalization of Einstein model of Brownian motion when key parameter of the time interval of free jump degenerates via solution and its gradient. This phenomena manifest in two scenarios: a) when fluid is highly dispersing like a non-dense gas and b) when distance of the flow w.r.t source is so big that velocity and gradient of the pressure are not subject to linear Darcy equation. In this work we jointly investigate a question what feature will exhibit particles flow if time interval of free jump inverse proportional to density of the fluids and its gradient. It was shown that in this scenario, the flow exhibits localization feature, namely: if at some moment of time t_0 in the region gradient of pressure or pressure itself is equal zero then for some T during time interval $[t_0, t_0 + T]$ there is no flow as well. This directly link to Barenblatt's finite speed of propagation property for degenerate equation. Method of proof is very different and based on application of Ladyzhenskaya - De Giorgi iterative scheme and Vespri - Tedeev technique.