New Travelling Wave Solutions for an Asymmetric Model of a Rod in a Lattice Fluid with Nonlinear Advection

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Based on the modified extended tanh-function method, we consider the continuum problem of the driven diffusive flow of particles behind an impenetrable obstacle (rod) of the length L. The results show that the presence of an obstacle, whether stationary or moving, in a driven diffusive flow with nonlinear drift will distort the local concentration profile to a state which divided the (x,y)-plane into two regions. The concentration is relatively higher in one side than the other side, apart from the value of $\frac{D}{vL}$, where D is the diffusion coefficient and v is the drift velocity. This problem has relevance for the size segregation of particulate matter which results from the relative motion of different-size paricles induced by shaking. The obtained soultions include soliton, periodical, rational and singular solutions.

Key words: Lattice Fluid Models; Diffusion-Advection Processes; Modified Extended tanh-Function Method; Symbolic Computations.