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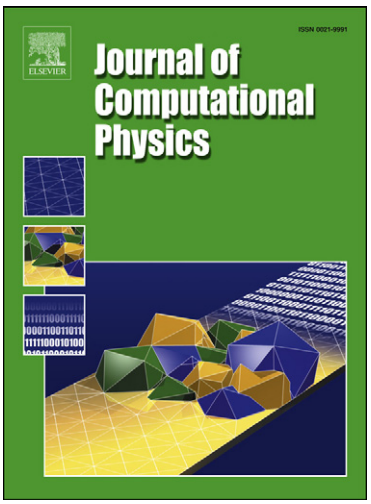

Truncation effect on Taylor–Aris dispersion in lattice Boltzmann schemes: Accuracy towards stability

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Highlights

- Closed analytical form is derived for truncation dispersivity of the d2Q9 advection-diffusion LBM scheme.
- In higher Péclet-range, its relative contribution to Taylor result becomes Pe- and velocity-independent.
- Numerical dispersivity vanishes for equilibrium-velocity-weight dependent solution of free eigenfunction product in two-relaxation-times (TRT) collision.
- Analytically predicted longitudinal dispersivity is in excellent agreement with the numerical experiments.
- The d2Q5 TRT bounce-back scheme achieves maximum accuracy for most stable relaxation parameters.