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Hydrodynamic computational models for nonequilibrium fluid dynamics and issues of projecting their solutions into phase space[1] RHO SHIN MYONG, Gyeongsang National University, BYUNG CHAN EU[2], McGill University — There exist growing interests in developing proper mathematical models of the physical process in the mesoscopic regime. Notable examples can be found in micro- and nano-scale fluid flows and rarefied hypersonic gas flows. In this work, a method to derive high-order hydrodynamic equations for nonequilibrium fluid dynamics is presented. In addition, a slip model based on Langmuir's theory of adsorption of gases on solids is developed in order to describe the gas-surface molecular interaction in micro- and nano-scale system. Finally, issues of reconstructing a solution in phase space from information available in thermodynamic space will be discussed through the investigation of a one-dimensional shock wave flow of monatomic gases.

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