

Simulation of Supersonic Binary Gas Flow

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In this work we consider the modeling of gas mixtures flow when the Knudsen numbers close to applicability limit of the continuum. We propose combined approach for simulation of supersonic binary gas flow. Macroscopic approach is based on the quasi-gasdynamics equations (MQGD) and the correction of the flow parameters is performed by molecular dynamic method (MMD). The parallel algorithm is built on a splitting into physical processes. MQGD system is a generalization of quasi-gasdynamics equations for the case of the gas mixture. They are solved by finite volume method. The system of molecular dynamic equations is used as a sub-grid algorithm. Within the MMD algorithm the interactions of particles are described by the Lennard-Jones potential, which is determined by the properties of the mixture components and their thermal conditions. The MMD allows you to get information about processes on molecular scale, and at times of a few nanoseconds.

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