SOME NUMERICAL ASPECTS OF THE MODELING OF THE SHOCK WAVE – PARTICLES CLOUD INTERACTION USING TWO-FLUID MODEL

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Abstract: The work is dedicated to the parametric numerical study of the shock wave – particles interaction in a dense bed. The problem is solved using two-fluid approach when both gaseous and dispersed phases are considered to be compressible media with different velocities and pressures. The system of governing equations has the hyperbolic type and is solved using HLL (Harten–Lax–Leer) numerical scheme. The statement of the problem corresponds to the natural experiment. The main features of the process are obtained in the calculations, namely, the formation of the transmitted and reflected waves and the motion of the particle cloud with a sharp front edge and with a smearing trailing edge. The calculated amplitudes of the reflected and transmitted waves as well as the dynamics of the cloud motion are compared with the experimental data. The influence of parameters in the dispersed-phase equation of state on the process is also investigated.

Keywords: shock wave; cloud of particles; close packing limit; two-phase medium; mathematical modeling; hyperbolic system of equations; HLL numerical method

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