NUMERICAL MODELING OF SHOCK WAVE – MOVING CYLINDER INTERACTION

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Abstract: The problem of interaction of a planar shock wave with cylinders of different mass is considered. A cylinder can move translationally under the action of pressure force. The mathematical model is based on two-dimensional Euler equations. The numerical algorithm is based on the Cartesian grid method for calculating flows in the areas with variable geometry. The algorithm and its program realization are tested on the problem of cylinder lifting behind a transmitted shock wave. The time histories of the cylinder speed are plotted. The explanations of the curves for cylinders of different mass are given. For one cylinder mass, the analysis of the dynamics of cylinder motion is carried out considering wave patterns realized as a result of shock wave – cylinder interaction.

Keywords: shock wave; moving cylinder; numerical modeling; Cartesian grid method; Euler equations

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