Methods for Computation of Thermodynamic States of Mixed Cells in Lagrangian Gas Dynamics

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The problem of correct computations of mixed cells containing two and more materials arises during computations in Lagrangian-Eulerian and Eulerian variables. One of the important problems here concerns correct computations of the thermodynamic state of components in Lagrangian gas dynamics being an integral part of the Lagrangian-Eulerian technique. The paper considers several computational methods for thermodynamic states of mixed cells in Lagrangian gas dynamics differing in their closing relations. The methods based on the following assumptions are studied:

1. one and the same compressibility of components;
2. equal pressures of components;
3. equal pressure increments of components;
4. equal velocities of components;
5. parameters of materials are determined as a result of solving Riemann problem.

The paper presents computation results for several problems that allow comparison of the methods with regard to their efficiency and accuracy. It is shown that each of the methods of interest has its own applicability area and the choice of what method is preferable is made depending on the physical problems to be solved.