MATHEMATICAL MODELING OF DETONATION PROPAGATION IN A TUBE WITH VARIABLE CROSS SECTION USING UNSTRUCTURED COMPUTATIONAL GRIDS

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Abstract: The finite-volume computational algorithm of the second approximation order for the calculation of two-dimensional flows with detonation waves on fully unstructured meshes with triangular cells is developed. The problem of detonation initiation and propagation in an axisymmetric tube of variable cross section filled with the stoichiometric hydrogen−air mixture is considered. Three geometrical configurations of the tube are investigated, each with its own degree of the divergence of the tube in terms of the pressure produced by the detonation wave at the end wall of the tube. The problem solved relates to the problem of waste recycling in the devices based on the detonation combustion of the fuel.

Keywords: detonation wave; unstructured computational grids; mathematical modeling; tube with variable cross-section

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