
Computational modeling of rocket engine jet torch gasdynamics

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The method of numerical simulation of gas-dynamic parameters of a torch of a rocket engine with solid fuel has been developed. It is shown that this method of computation gives a sufficiently high accuracy of simulation results: this allows us to find a 'thin' structure of gas-dynamic characteristics of the torch. It is established that in the gas-dynamic torch of combustion products there appears a combined multi-jump picture of flowing formed by a system of three types of intersecting jumps: a shock wave appearing at the interface of a slipstream and combustion products in the torch; the jump caused by the nozzle outlet angle bounding the exterior shape of the torch and the jump caused by the difference of densities of combustion products at the nozzle outlet and of the undisturbed flow. Examples of numerical simulation are shown for distribution of gas-dynamic parameters in a torch of a rocket solid-propellant engine.

Keywords: *gas dynamics, computational modeling, rocket engine jet torch, solid propellant, TVD method.*

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