

NUMERICAL SIMULATION OF WORKING PROCESS IN RAMJET–TYPE PDE

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Abstract. One concept of supersonic ramjet–scheme pulsing engine that had been studied numerically in [1]. Results of new parametric numerical investigations, intended to improve the characteristics of such PDE, are described. A new boundary condition on a perforated wall is used; this condition allows to describe in more details the process of gas flow through the perforation and to estimate the additional force that acts on the wall. Modifications of the PDE geometry are proposed in order to attain the value of useful force, which would be several times higher than outer drag, and to prevent the compression wave from coming into inlet. The results of the working cycle numerical simulation are presented for PDE with modified geometry. Estimations of possible thrust–efficiency characteristics and of the cyclical working process frequency are given. It is analyzed how various elements of the engine construction contribute to longitudinal force that acts on the PDE.

Keywords. Numerical simulation, Ramjet–scheme PDE, Aircraft engine, Parametrical calculations.