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Тезисы
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In order to increase the mobility and maneuverability of the transport and installation equipment units of promising missile systems, a method has been developed to assess their mobility and maneuverability, taking into account the effect on their traction and dynamic characteristics, structure, composition, parameters and control algorithms of a combined transmission based on controlled valve-inductor drives.

The developed methodology makes it possible to assess the relationship between mobility, cross-country ability, traction and dynamic characteristics of transport and installation equipment units of advanced missile systems and the structure, composition, parameters of a combined transmission using controlled valve-inductor drives and control algorithms for them.

The methodology substantiates the purpose, composition and structure of the initial data, developed an algorithm for assessing the mobility and cross-country ability of transport and installation equipment units of promising rocket complexes using a combined transmission based on valve-inductor drives, an example of using the method for assessing the mobility and cross-country ability of heavy-duty vehicles with the use of a combined transmission based on valve-inductor drives, the areas of application of the developed technique and directions for its further improvement are indicated.

The results of approbation of the technique using the example of the SO-755 unit revealed an increase in the mobility indicators, the cross-country ability of transport and installation equipment units of promising missile systems using a combined transmission based on valve-inductor drives compared with the mobility indicators, the cross-country ability of heavy-duty vehicles using a combined transmission based on known electric drives.
Numerical research of pressure and thrust pulsations in the combustion chambers of solid propellants

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The operation of the combustion chamber (CC) of a solid fuel rocket motor is characterized by high pressures, high fuel combustion rates and a complex composition of combustion products. Self-oscillations of operating parameters exceeding the limits can lead to the development of various types of instabilities in the CC. This affects the likelihood of malfunctions in the operation of both individual systems and the rocket engine as a whole. The main sources of instability are unsteady combustion of the solid fuel charge and gas-dynamic instability of the flow in the gas-dynamic path. The complex configuration of CC in modern engines leads to the fact that the flow of combustion products is characterized by a vortex structure with the presence of stagnant zones and areas of flow separation. The vortices generate acoustic signals that affect the change in the characteristics of the main flow. When the frequency of vortex formation coincides with the natural acoustic oscillations of the CC the amplitude of pressure pulsations increases.

The paper presents mathematical methods for determining the natural frequencies of the gas cavity of the CC. For mathematical modeling in the axisymmetric formulation the solution of the equations of gas dynamics is used together with the low Reynolds k-ε turbulence model or the LES model of large-scale eddies. The results of numerical studies of the gas-dynamic structure of the flow show the presence of intense vortex formation. This makes a significant contribution to the position of the first modes and the amplitude of acoustic pressure oscillations. A pronounced vortex flow pattern leads to a significant increase in the amplitude of pressure pulsations. On the basis of the calculated data, a refined method is presented for determining the natural acoustic frequency of a CC with a complex charge configuration based on the principle of bringing the free volume of the chamber to a cylindrical shape. The relationship between the pulsation characteristics in the CC and the rocket engine thrust oscillations has been investigated. Taking into account the complex shape of the combustion surface, the development of a calculation technique that allows simulating a complex vortex gas-dynamic structure of the flow is an important link in identifying the causes and preventing possible instability (pressure and thrust pulsations) in the operation of a rocket engine on new high-energy fillers.