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# COMPARATIVE ANALYSIS OF THE OPERATION OF LIQUID-FUEL ROCKET ENGINE PUMP TURBINE IF EQUIPPED WITH THE AUXILIARY BOOSTER PUMP PACKAGE

V.S. Ivashin

ivashin-ryo@yandex.ru

SPIN-код: 9338-5439

Yu.V. Anishchenko

anishchenko@v@mail.ru

SPIN-код: 7512-5117

Bauman Moscow State Technical University, Moscow, Russian Federation

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## Abstract

We have conducted numerical computation and analyzed the operation of the pump turbine equipped with a booster pump. The calculation has shown that the installation of the booster pump package in the fuel feed system of the liquid-fuel rocket engine allows increasing the angular spin rate of the pump turbine shaft in 9,2 times, which, in its turn, serves to reducing the mass of the whole pump turbine due to the reduction of the wheel outside diameter. Therewith, it becomes possible to reduce the tank pressurization and, consequently, their mass significantly. The booster pump package enables increasing the efficiency owing to increasing the pump speed coefficient. However, the installation of the booster pump results in the complication of the structure, the loss in reliability and the increase in the dimensions of the whole system.

## Keywords

Pump turbine, booster pump package, fuel feed system, spin rate, pump speed coefficient, rocket engine

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**Ivashin V.S.** — student, Department of Rocket Engines, Bauman Moscow State Technical University, Moscow, Russian Federation.

**Anishchenko Yu.V.** — Research Technician, Scientific Training Center of Photon Energy Physics, Bauman Moscow State Technical University, Moscow, Russian Federation.

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