NUMERICAL INVESTIGATION OF ROTOR DYNAMICS IN A CENTRIFUGAL PUMP WITH HYDROSTATIC BEARINGS

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Abstract

The article deals with computing parameters of a pump that is a part of a spacecraft thermal control system. This system should ensure accurate temperature control and make it possible to vary it in a desired range. Continual changes in the environment result in the pump stopping and consequently restarting its operation frequently enough. Starting the operation requires the pump rotor to "float". The less time it takes for the rotor to float, the more reliable and durable the pump is. We describe the process of developing a mathematical model for the pump start-up. We present a calculation of forces and torques affecting the rotor. We obtained equations for computing angular velocity that leads to the rotor "floating".

Keywords

Pump, viscous friction torque, rotor, hydrostatic bearing, mathematical model, moment of inertia of a rotor, angular velocity

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