OBTAINING STEADY-STATE ANGULAR VELOCITY AS A FUNCTION OF VARIOUS PUMP PARAMETERS DURING STRONG ROTOR VIBRATIONS

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Abstract

We present the design, main parts and principle of operation of a low-discharge centrifugal pump. To solve the problem of determining steady-state rotor rotation frequency affecting the head characteristic, we developed a mathematical model of the rotor moving within the inner rings of hydrostatic bearings. The model presented takes into account such power factors as radial force, rotor weight, viscous friction force, static reaction force of the bearing, normal reaction of support, electric motor torque, viscous torque, runner torque. We used a Runge—Kutta RK4 adaptive stepsize numerical technique to obtain the angular velocity of the rotor shaft as a function of structural pump parameters and operating medium properties

Keywords

Rotor, hydrostatic bearing, low-discharge centrifugal pump, mathematical model, angular velocity, fitting

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