CONTRIBUTIONS TO SOLVING THE EQUATIONS OF THE FUNCTIONAL FEATURES OF TURBOPUMPS

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Abstract

Turbopumps are hydraulic generators that are indispensable to the pressurized and/or free level hydrotechnical systems. These are used mainly for high pumping flows. They are characterized by high velocity of the fluid in relation to the active parts and the fact that the pumped flow varies in relation to the pumping height. For accurate sizing and simulation of their functioning, we suggest a new analytical expression for the determination of the power feature for a constant rpm. Unlike the polynomial function of the second degree, present in field literature, we approximated the analytical expression for the power feature for constant rpm of the turbopump using a rational function with five coefficients. We theoretically determined the analytical expression for the loading feature for variable rpm and applied various methods of statistical processing in order to determine the actual numerical values for the coefficients of functional features of the turbopumps. We noticed that among the statistical processing methods of the experimental data, the most accurate results were achieved by our mathematical model, using the method of minimisation of the sum of the absolute values of the deviations.

Key words: functional features of turbopumps, variable rpm, statistical methods