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INVESTIGATION OF GAS FLOW IN THE FLOW PART OF THE JET-REACTIVE TURBINES USING SOFTWARE COMPLEX "FLOWVISION"

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The purpose of the work is to study the flow of gases and liquids, using software package FlowVision, the gas flow in the jet- reactive turbine, followed by the analysis of the results and conclusion of the feasibility of using this method of calculation.

Jet- reactive turbine is designed to convert the potential energy of the compressed gas into the kinetic energy of the supersonic flow, outflowing from the traction nozzle. This outflowing jet creates a torque that can be used to drive machines or to convert to electricity. Structurally, the jet- reactive turbine is very simple. It comprises a rotor, consisting of a shaft and impeller (RK), a diffuser and an inlet nozzle.

After comparing with classical vaned turbine, we can see that jet-reactive turbine has several advantages:

1) simplicity of design;
2) a high level of unification;
3) high reliability in extreme working conditions;
4) low weight and moment of inertia of the rotor;
5) low device cost;
6) easy operation and low maintenance.

A solid model of full nozzle and its segment was created in the system SolidWorks 2010. The flow of gas in this model was discovered in software package FlowVision.

After comparing the results of calculating the full nozzle and its segment, it can be concluded that the use of a sector nozzle for research is much more efficient than a full nozzle. The calculation has been carried out on a complete nozzle at 38732 cells, whereas on payment sector - at 3289 cells. Accordingly, the passage of each iteration in the calculation of complete nozzle was about 8 seconds, whereas when calculating nozzle sector - about 0.4 seconds.With a relatively small calculation error (about 2%), the use of a calculation model of a nozzle sector accelerates the rate of approximately 800 times.

Application software package FlowVision as a basic framework for the research has been justified, it has been confirmed by the high precision calculations and extensive visualization capabilities of flow for later analysis.