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Optimization Design of a High-speed Radial-axial Flow Cryogenic Turbo-expander

In this paper, optimization design for whole performance of a high-speed radial-axial flow cryogenic turbo-expander is discussed in this paper. The design method based on the principle of one-dimension-steady flow was adopted to successfully design out a radial-axial-flow turbo-expander for the cryogenic system. Then numerical simulation and detailed analysis were carried out based on the designed turbine with its given working condition using NUMECA software. We obtained the temperature field, pressure field, streamlines and isentropic efficiency, so optimization design could be achieved including the geometry of impellers and boundary conditions for an efficient turbo-expander.

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