

Article Abstract

Title:	A numerical model for the design of a mixed flow cryogenic turbine
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Abstract:	Present day cryogenic gas turbines are in more popular as they meet the growing need for low pressure cycles. This calls for improved methods of turbine wheel design. The present study is aimed at the design of the turbine wheel of mixed flow impellers with radial entry and axial discharge. In this paper, a computer code in detail has been developed for designing such turbine wheel. To determine the principal dimensions of the turbine wheel, optimum operating speed has been taken from design charts based on Similarity principles. The algorithm developed, allows any arbitrary combination of fluid properties, inlet conditions and expansion ratio, since the fluid properties are properly taken care of in the relevant equations. The computational process is illustrated with an example. The main dimensions, thermodynamic properties at different states, velocity and angles at entry and exit of the turbine wheel were worked out. The work may help the researchers for further design and development of cryogenic turboexpander depending on their operating parameters.
Keywords:	Cryogenic, turboexpander, mixed flow turbine, flow angle, flow velocity