

# 26th National Symposium on Cryogenics and Superconductivity

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## Blade profile design of cryogenic turbine

### Content :

Cryogenic gas turbines are becoming more popular as they are meeting growing need for low pressure cycles in various cryogenic process and liquefaction plants. As the performance of a turbine depends on the turbine wheel, this project is aimed at the exhaustive design of the turbine wheel of mixed flow impellers with radial entry and axial discharge. An attempt has been made to design profile of the expansion turbine wheel used in a turboexpander. To determine the principal dimensions of the turbine wheel, operating speed has been taken from design charts based on similarity principles and Hasselgruber's technique is used to design the profile of the turbine wheel. A matlab code in detail has been developed for designing such blade profile. Optimum solution for some of the free parameters and angles between velocity components was found. On the basis, co-ordinates of this blade profile were computed. The computational procedure developed describes the three-dimensional contours of the turbine wheel. The flow of fluid in a turbine blade passage depends on the length of the flow path and the curvature of such path.

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