

# Abstract

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## Numerical Simulation of Turbulent Heat Transfer in Turbine Blades

Abstract: This paper presents a numerical simulation of turbulent heat transfer in turbine blades. The study is conducted using a finite volume method (FVM) based on the Reynolds-averaged Navier-Stokes (RANS) equations. The turbulence is modeled using the  $k-\epsilon$  turbulence model. The computational domain is discretized using a structured grid. The inlet conditions are specified as a fully developed turbulent flow with a Reynolds number  $Re = 10000$  and a turbulent intensity of 5%. The outlet conditions are specified as a fully developed flow. The wall boundary conditions are specified as a constant temperature of  $1000\text{ K}$ . The results show that the turbulent heat transfer coefficient is significantly higher than the laminar heat transfer coefficient. The maximum temperature is found at the leading edge of the blade. The results are compared with experimental data and show good agreement.