

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 simulation is performed using a finite volume method (FVM) based on the Navier-Stokes equations. The turbulence is modeled using the $k-\epsilon$ model. The results show that the heat transfer coefficient is significantly higher in the turbulent region compared to the laminar region. The maximum heat transfer coefficient is found to be approximately $100,000 \text{ W/m}^2$ at the leading edge of the blade. The simulation results are compared with experimental data, and a good agreement is observed. The results indicate that the numerical simulation is a reliable tool for predicting the heat transfer characteristics of turbine blades.