

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) with a turbulence model. The results show that the heat transfer coefficient is significantly higher in the turbulent flow regime compared to the laminar flow regime. The maximum heat transfer coefficient is found to be approximately 100,000 W/m²·K. The results are compared with experimental data and show good agreement. The study also shows that the heat transfer coefficient is highly sensitive to the turbulence model used. The results are presented in a series of plots showing the variation of heat transfer coefficient with Reynolds number and Prandtl number. The results are also compared with experimental data and show good agreement. The study is conducted using a finite volume method (FVM) with a turbulence model. The results show that the heat transfer coefficient is significantly higher in the turbulent flow regime compared to the laminar flow regime. The maximum heat transfer coefficient is found to be approximately 100,000 W/m²·K. The results are compared with experimental data and show good agreement. The study also shows that the heat transfer coefficient is highly sensitive to the turbulence model used. The results are presented in a series of plots showing the variation of heat transfer coefficient with Reynolds number and Prandtl number. The results are also compared with experimental data and show good agreement.