

# 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 flow is assumed to be incompressible and steady-state. The inlet conditions are defined by a velocity profile and a temperature profile. The outlet conditions are defined by a pressure profile. 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/m<sup>2</sup>. The results are compared with experimental data and show good agreement. The study is conducted for a Reynolds number (Re) of 10,000 and a Prandtl number (Pr) of 0.7. The inlet velocity is 100 m/s and the inlet temperature is 550 K. The outlet pressure is 100,000 Pa. 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/m<sup>2</sup>. The results are compared with experimental data and show good agreement. The study is conducted for a Reynolds number (Re) of 10,000 and a Prandtl number (Pr) of 0.7. The inlet velocity is 100 m/s and the inlet temperature is 550 K. The outlet pressure is 100,000 Pa.