

Numerical Analysis of Swirling Chamber Using Improved Delayed Detached Eddy Simulation Turbulence Model

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Abstract : Swirling chamber is a promising cooling method for heavily thermally loaded parts like turbine blades due to the additional circumferential velocity and therefore improved turbulent mixing of the fluid. This paper investigates numerically the effect of turbulence model on the heat convection of the swirling chamber. Grid independence analysis is conducted to obtain the proper grid dimension. The work validated with experimental data available in the literature. Flow analysis using improved delayed detached eddy simulation turbulence model and Reynolds averaged Navier-Stokes k- ϵ turbulence model is carried. The flow characteristic near the exit is reformed when improved delayed detached eddy simulation model used.

Keywords : gas turbine, Nusselt number, flow characteristics, heat transfer

Conference Title : ICCTFD 2019 : International Conference on Computational and Theoretical Fluid Dynamics

Conference Location : Bangkok, Thailand

Conference Dates : January 17-18, 2019