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عنوان مقاله:

Investigation of Effect of Vortical Structures on Turbine Blade leading Edge Film Cooling Using Large Eddy Simulation

محل انتشار:

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خلاصه مقاله:

The present paper investigates vortical structures effect on turbine blade leading edge film cooling flow field using the Large Eddy Simulation (LES). Coherent structures have been visualized by second invariant of the velocity gradient tensor (Q criteria). For this purpose, three blowing ratios of ۰.۴, ۰.۸ and ۱.۲ have been investigated. Results have been captured the available experimental data by acceptable accuracy. In observation of coherent motions, it has been shown that the vortex tubes, primary vortices and hairpin vortices are the most imperative ones in leading edge film cooling flow field. Besides, results imply that an increase in blowing ratio leads to the formation of muchmore hairpin vortices and reducing the number of vortex tubes. This phenomenon decrease the overall adiabatic effectiveness during the blowing ratio amplification. Moreover, it has been identified that hairpin vortices creation results in the .reduction of adiabatic effectiveness

کلمات کلیدی:

Coherent structures, Leading edge Film cooling, Blowing ratio, LES

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