

عنوان مقاله:

Effect of blade profile on the performance characteristics of axial compressor in design condition

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نویسندگان:

Sarallah Abbasi - School of Mechanical Engineering, Arak University of Technology, Arak, Iran

ali joodaki - The university University of Ayatollah ozma Boroujerdi at Iran

خلاصه مقاله:

The choice of geometrical shape of the blades has a considerable effect on aerodynamic performance and flow characteristics in axial compressors. In this paper, the effects of the blades shape on the aerodynamic design characteristics are investigated based on Streamline Curvature Method (SCM). Initially, the Streamline Curvature Method (SCM) is used for designing a two-stage axial compressor. Comparing the current results with experimental ones indicates good agreement. The first stage of the axial compressor is selected with three different blade profiles. The first case (case I) has the polynomial camber with naca thickness distribution series 6. The second case (case II) has the standard naca profile series 6 and the third case (case III) has the modified standard naca profile series 4. Results reveal that using the standard airfoils in the stators leads to improved flow conditions such as loss coefficient and pressure ratio. On the contrary, this profile selection may cause an increase in the stagger angle that is not favorable. Aerodynamic Design with a polynomial camber line in the rotor demonstrates a better aerodynamic behavior in loss coefficient, pressure ratio and diffusion factor. Whilst the use of such a camber line in the stator leads to the formation of less favorable aerodynamics conditions in comparison to the standard airfoil.

کلمات کلیدی:

Axial Compressor, Streamline Curvature Method, Blade Geometry, Design condition

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