

OPTIMAL DESIGN OF ROTOR BLADES FOR AN AXIAL COMPRESSOR USING GRADIENT BASED METHOD

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Keywords: Optimization, Axial compressor, CFD, Stacking line

Abstract: Design optimization methods for rotor blades of an axial compressor have been developed by using the Computational Fluid Dynamics (CFD). In order to improve the aerodynamic performances, such as pressure ratio and adiabatic efficiency, three-dimensional Reynolds averaged Navier-Stokes analysis was used for the single stage axial compressor. The optimum design process considering the aerodynamic characteristics consists of designing the shape using the Non-Uniform Rational B-Spline (NURBS) function and performing the optimum design with Gradient-Based Optimization Method (GBOM). For the proceeding of automated optimization, the commercial code ANSYS CFX ver. 16.1 and Design Exploration were applied. Results show that the newly designed model demonstrated better performance than the reference model. In particular, the pressure ratio was found to be higher than that of the reference model.