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ANALYSIS OF HEAT TRANSFER IN ROTATING COMPRESSOR DISC CAVITY

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Abstract

A thorough study of heat transfer in a rotating cavity with a central axial through-flow of cooling air is essential for the design of future high pressure compressor drum in an aero engine. Hence a heated rotating compressor disc with an axial through-flow of cooling air is considered, to built up a numerical model for understanding the heat transfer in the cylindrical cavities between adjacent discs of a high pressure gas turbine compressor. The three-dimensional, time-dependent governing equations are solved based on the finite volume technique. There is a reasonable agreement between correlated and predicted Nusselt numbers for a surface temperature distribution similar to that used in the experimental work to obtain a correlation.

Keywords: Three-dimensional, Time-dependent, Numerical computation, aero engine