عنوان مقاله:

A ۲-D Numerical Investigation on the Modal Characteristics of Rotating-Stall with a Variable-Cascade- Length Approach in an Axial Compressor

محل انتشار:

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خلاصه مقاله:

The Rotating-Stall (RS) through a rotor-cascade of an axial compressor were numerically investigated with an unsteady two-dimensional finite-volume density based computer code. To validate the computer code, a test case was prepared and the good agreement of the compared results has given the adequate assurance of the code. The RS was incepted with a ۴۰% reduction in flow coefficient and a ۰.۴% increase in the load coefficient from their normal operating values. The velocity traces from numerical probes, for all chosen number of blades had a periodic behavior, during RS effect. It was also concluded that the captured modal characteristics of RS may vary with varying the number of blades and this variation may cause various modes of RS. Moreover, in each mode, decreasing the number of blades may cause phase lag times in stall progress. In studied cases, approximately two modes and a transient mode were captured which had different rotational speeds and modal characteristics. Finally, a minimum required number of the blades for the RS inception studies (in spite of large numbers in previous works) was proposed, to intensify the probability of using shorter cascades in stability margin calculations of a compressor.

کلمات کلیدی:

Rotating, Stall, Number of Blades, rotor, Cascade, Finite, Volume, Axial Compressors