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风扇/压气机转子、静子干涉噪声的预测方法

孙晓峰, 胡宗安, 周盛

北京航空航天大学

NOISE PREDICTION OF ROTOR-STATOR INTERACTION FOR FAN/COMPRESSOR

Sun Xiaofeng, Hu Zongan, Zhou Shen

Beijing University of Aeronautics, Astronautics

摘要

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摘要

本文采用管道声学模型计算了由转子尾迹与静子相互作用产生的干涉声音的大小。分析了转子、静子相对距离的变化对声音大小的影响,并与试验结果进行了对比。

关键词: 噪声 风扇 压气机

Abstract:

A method for predicting the noise generated by rotor wake-stator interaction is presented by solving the generalized Lighthill equation in the paper. First of all, a wake model behind the rotor blades is given. Then, the unsteady forces on the stator blades can be computed, using a 2-dimensional compressible unsteady computation method. At last, the rotor stator interaction noise is obtained, considering the effects of the compressor tube on the noise fields. The total noise power depends on the following parameters: stagger angle and chord of stator blade, spacing of rotor/stator, Ma number, rotor speed and wake model behind the rotor blades. Some numerical results are given to analyse the effect of the spacing of rotor-stator on the noise radiation. The estimated results show a reasonable agreement with the experimental data.

Keywords: noise fans compressors

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