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跨声轴流压气机转子尾迹的总压平均方法

Total pressure averaging method in rotor wake of transonic axial compressor

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中文关键词: [跨声压气机](#) [转子尾迹](#) [总压测量](#) [质量平均](#) [面积平均](#)

英文关键词: [transonic compressor](#) [rotor wake](#) [total pressure measurement](#) [mass-average](#) [area-average](#)

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中文摘要:

对一台跨声轴流压气机转子的尾迹流场进行了数值模拟研究和总压实验测量, 结合理论分析方法, 研究了面积平均和质量平均这两种常用的总压平均方法在跨声轴流压气机转子尾迹测量中的联系与差异. 结果表明: 在靠近转子尾缘的测量截面, 由于转子尾迹流场中存在总压高而轴向速度低的区域, 导致面积平均总压大于质量平均总压; 而随着尾迹与主流在下游逐渐掺混均匀, 面积平均总压又小于质量平均总压. 两种总压平均方法的这一规律性关联可以在研究压气机转子尾迹特征尤其是进行数值计算和实验测量结果对比分析时提供一些有价值的参考.

英文摘要:

Numerical simulation and experimental measurements were conducted to investigate the rotor wake of a transonic axial compressor. Combined with theoretical analysis, the relations between area-average total pressure and mass-average total pressure that are commonly calculated in transonic rotor wake flow fields were studied. The results showed that the area-average total pressures were larger than the mass-average total pressures at surfaces close to rotor trailing edge because of the existence of the wake flow, which had higher total pressure and lower axial velocity than the main flow. However, the downstream area-average total pressure changed to become smaller than the mass-average total pressure as the wake dissipated under the interaction with the main flow. These results can provide some references for investigations on the compressor rotor wakes, especially during comparative analysis of computational and experimental results.

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