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涡扇发动机热力学分析

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THERMODYNAMIC ANALYSIS OF TURBOFAN ENGINES

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摘要

本文将混排涡扇发动机拆为内外函分循环结算,以阐明各自的实际热力学功能。按定比热简化解出主要性能最有利的三个特征压气机压比,并与变比热准确解作了比较。

关键词:

Abstract:

Based on the thermodynamic principles, a mixed exhaust turbofan cycle is split into an inner "regenerative" subcycle and an outer simple subcycle （Fig. 2） with the borrowed work （Eq. 2） and the borrowed heat （Eq. 3） refunded to the inner subcycle. The performance of the engine is shown to be composed of subcycles'performances through respective fraction ratios a and (3 as in Eqs. 4-10. Fig. 3 gives a thorough view of the energy and efficiency relation in the subcycles as well as for the whole engine. The illustrated example in Table 1 indicates that, although combined with an efficient inner regenerative subcycle, a low compression and low heating outer subcycle gives a thermal efficiency inferior to the corresponding simple jet engine. The overall efficiency, thrust and specific fuel consumption are better only due to high propulsive efficiency. The respective functions of two subcycles in the engine are thus elucidated.

Keywords:

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