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论文

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螺旋桨升力线理论的匹配渐近展开法分析

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THE ANALYSIS OF PROPELLER LIFTING LINE THEORY BY THE METHOD OF MATCHED ASYMPTOTIC EXPANSIONS

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摘要

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摘要 在固连于螺旋桨桨叶的非惯性坐标系中,对大展弦比叶片的螺旋桨建立了升力线模型。在匹配渐近展开法分析中引入一假想速度位,导出固连坐标系中的控制方程、边界条件和Bernoulli方程。由匹配渐近展开法的分析表明,在螺旋桨的进距比不是太小的情况下,螺旋桨的升力线理论在固连于螺旋桨桨叶的非惯性坐标系中仍然成立。

关键词: 螺旋桨 匹配 渐近法

Abstract: Lifting line model has been developed for propeller of large aspect ratio in blade-attached noninertial system. In the analysis of the method of matched asymptotic expansions, fictitious velocity potential is introduced. Control equation, boundary condition and Bernoulli equation are derived in blade-attached system. The analysis of the matched asymptotic expansions shows that if the advanced ratio of propeller is not very small, lifting line theory is still valid in blade-attached noninertial system for propeller.

Keywords: propellers matching asymptotic methods

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