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论文

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边条翼布局流场及其双垂尾抖振特性研究

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Investigation of Flow and Twin-Vertical Tail Buffet Characteristics of Leading-Edge Extension Configuration

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摘要

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摘要 对边条翼双垂尾布局模型的流场进行了激光片光源显示实验研究。实验在西北工业大学NF-3风洞三元实验段进行。实验记录了沿机身轴向从边条到垂尾后缘共8个剖面位置的流动状态。测试迎角范围10°~35°, 风速4m/s。通过边条涡流场随迎角的发展和破裂特性与前期双垂尾抖振实验获得的模型垂尾抖振响应特性的对比分析发现:垂尾翼根弯矩、翼尖加速度响应随迎角的变化均与边条涡的发展状态、是否破裂以及破裂程度密切相关。从而得出结论:边条涡破裂是引起边条翼布局双垂尾抖振的主要原因。

关键词: 激光片光源 边条涡 双垂尾抖振 翼根弯矩 翼尖加速度

Abstract: A flow visualization experiment to a Leading-Edge Extension (LEX) Configuration is conducted in the NF-3 wind tunnel at Northwestern Polytechnical University using a laser light sheet technique. The flow visualization pictures are obtained at eight longitudinal stations from Leading-Edge Extension to the trailing edge of the vertical tail by the laser light sheet. Combining with the result of the vertical tail buffet characteristic obtained from the wind tunnel experiment, the visualization experiment come to the conclusion that the bursting of the vortex shed from LEX is the primary contributor to the twin-vertical tail buffet.

Keywords: laser light sheet LEX vortex twin-vertical tail buffet root bending moment tip acceleration

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