论文

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捆绑式运载火箭气动力计算

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AERODYNAMIC COMPUTATIONS FOR LAUNCH VEHICLE WITH STRAP-ON BOOSTERS

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摘要	参考文献	相关文章

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摘要 应用细长体摄动理论和边界元数值解法发展了一种适用于计算捆绑式运载火箭气动力的工程数值计算方法。本法可利用已有芯级火箭的气动力数据,加上安装助推器后净增值,得到捆绑状态火箭的气动力,例如法向力、侧力以及力矩等。本法还可分别计算出捆绑状态下芯级和各助推器所受的气动力。对我国C火箭和日本N火箭的计算结果与实验数据比较,说明该方法能满足方案设计阶段精度要求。是方案设计过程中快速而经济的计算方法。

关键词： 运载火箭 助推器 空气动力 细长体理论 边界元素法

Abstract： An engineering numerical aerodynamic computation method applicable to launch vehicle with strap-on boosters has been developed using the perturbation theory for slender body and the boundary element method (BEM). In this paper, the aerodynamic forces of the launch vehicle with strap-on boosters can be calculated by means of the available data of the core and the aerodynamic increment due to adding the boosters. The aerodynamic forces acting on the core and the boosters can be calculated separately. The comparisons between the computations and experiments for the launch vehicle with strap-on boosters C of China and the launch vehicle with strap-on boosters N of Japan denote that the present method can satisfy the necessary accuracy and provide a rapid and economical method in the preliminary design phase.

Keywords： launch vehicle booster aerodynamic forces slender body theory boundary tlement method

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