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双轴卫星天线扰动特性建模、仿真及试验

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Two-axes mechanism for satellite antenna disturbance characteristics simulation and experiment

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摘要 卫星天线微振动是影响卫星姿态控制精度的重要因素,卫星天线扰动建模的目的是掌握其扰动规律,进而采取相应的控制方法和隔离技术.综合考虑卫星天线扰动源步进电机的扰动力以及天线结构固有模态对星体的扰动影响,建立了卫星天线机构机电一体系统对星体扰动力的数学模型.通过仿真计算,设计试验测试卫星天线扰动力,比较仿真结果和试验结果,对所建模型进行验证.比较结果表明:建立的天线扰动模型准确可靠,对卫星指向控制精度和稳定性的影响提供了借鉴和参考.

关键词: 双轴天线 步进电机 扰动

Abstract: The micro-disturbance of satellite antenna is a key factor which will affect the accuracy of satellite attitude control. The satellite disturbance modeling is aimed for obtaining the disturbance characteristics and then adopting corresponding control methods and isolation systems to restrain it. On account of the influence of both the antenna structure-s nature mode and the stepper motor to the satellite body disturbance, the satellite antenna structure-s disturbance math model was built. Based on the model simulation was calculated and an experiment was designed to test the disturbance. Comparing the simulation and experiment results the math model is correct and reliable and it-s a reference and a consult to the influence of the antenna to the pointing control precision and stability of the satellite

Keywords: two-axes satellite antenna stepper motor disturbance

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