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HIGH-PRECISION TEMPERATURE CONTROL METHOD STUDY BASED ON HIBERARCHY THERMAL CONTROL

Abstract

pacecraft precision temperature control technology is currently an important direction in spacecraft thermal control field. In order to solve the problem of spacecraft high- precision temperature control, the thesis makes a study about the method of spacecraft high -precision temperature control. A hiberaracy thermal control design method is proposed. The method lays equipments in different areas according to different indexs of equipments; heat insulation design is used between areas to gradually build a stable working environment for the high-precision temperature control equipment,supplemented by high-precision temperature control algorithm to achieve the purpose of high-precision temperature control in core area. The thesis derived the thermophysical parameters abcde and k influencing hiberarchy high- precision temperature control by theoretical derivation analysis and made a specfic analysis about the paramenters in virtue of digital thermal analysis tool. The results show that a hiberarchy thermal control design is an effective method to solving spacecraft high-precision temperature control. The digital thermal analysis results show hiberarchy thermal control make precision of temperature control better than 0.01; parameters abd and e only influence temperature level; parameter c not only influences temperature level, but also influence precise of temperature control; Conduct coefficient K influences temperature level more than precise of temperature control, due to the mounting surface high-precision active temperature compensated. The hiberarchy thermal control method provides a new way for solving spacecraft high- precision temperature control. The research results have a certain reference significance for further research of high-precision temperature control technology.