Paper ID: 69001
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IAF SPACE POWER SYMPOSIUM (C3)
Interactive Presentations - IAF SPACE POWER SYMPOSIUM (IPB)

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DESIGN OF MORE-ELECTRICAL-ROCKET ENERGY MANAGEMENT MODEL BASED ON SEMI-PHYSICAL SIMULATION VERIFICATION

Abstract

Compared with traditional carrier rockets, More-electrical-rocket is the core energy architecture of the next generation carrier rockets. It has the advantages of light weight, intelligence, high efficiency in integrated control and integrated power supply and distribution. However, how to create the optimal model of high and low voltage energy in each stage, and how to realize a high reliable information transmission model with power line communication are urgent problems to be solved. In this paper, a low complexity optimal energy dynamic programming model based on high voltage power line communication technology is proposed. Compared with the traditional energy allocation and management methods, it can optimize the resource allocation according to the different energy needs of each machine in all the stages that based on current energy storage situation on the rocket, and has higher allocation efficiency under the same complexity. On this basis, combined with the prototype of all electric servo, drainage power generation equipment and energy converter, this paper carries out the semi-physical simulation verification of energy management model. According to the difference between the theoretical value and the measured value, the correction factor is introduced to further improve the reliability of the energy management model. Compared with other models, the more-electrical-rocket energy management model with correction factor proposed in this paper has higher energy utilization efficiency and higher communication capacity.