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FLIGHT MODE DESIGN METHOD OF MULTI-CONFIGURATION COMBINATION BASED ON
COMPLEX MISSION

Abstract

Space station combination as a typical multi-configuration combination, during the orbit flight, the core module, experiment module and other basic in-orbit spacecraft and manned spacecraft, cargo spacecraft and other visiting docking spacecraft can be combined to form a variety of different flight configurations. In addition, the combination will carry out special in-orbit tasks such as orbit maintenance, in-orbit inspection, rendezvous and docking, evacuation, propellant replenishment mechanical arm manipulation and other tasks. It can be seen that the flight missions and flight status of the space station are complex, the frequency of executing each special task in orbit is high and the order is variable. Considering that the operation time of the space station combination is generally more than 10 years, if we continue to adopt the previous method of designing the aircraft flight scheme in chronological sequence, it can no longer meet the operation requirements of the space station combination. In order to improve the design efficiency of the flight scheme and reduce the repeatability work, the space station adopts a modular flight scheme design method, that is, it proposes a multi-configuration combination flight mode design method. First of all, the interface relationship between flight mode design and all parties is clarified. Secondly, the principle of determining flight mode and different flight mode is proposed. Finally, the design steps of general flight state are proposed and an example is given. The results of this paper can provide important design basis for multi-configuration combination flight mode design for complex flight missions.