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STUDY ON AUTONOMOUS PLANNING OF FLIGHT PROGRESS FOR MANNED SPACECRAFT

Abstract

In space station mission ordeep space exploration mission, due to the long term of mission targets, uncertainties of flight environment, communication delays and other factors, the manned spacecraft, such as Shenzhou manned spaceship and Tianzhou cargo spaceship, is strongly depended on the human and material resources, measurement and control resources. Autonomous planning of flight progress is one of the key technologies to achieve autonomous management. This paper proposes a design method of flight progress based on autonomous planning for manned spacecraft, which has some obvious characteristics in China's rendezvous and docking task. Firstly, the characteristics of mission planning and flight progress are discussed, and a planning method of flight progress based on ground control resources is shown. Secondly, an autonomous planning system is presented. The system consists of planning and scheduling module, check module, feedback module, characteristic point calculation module, and the knowledge configuration module. Thirdly, the typical characteristic point calculation method based on the global navigation satellite system is described in detail, such as ground station TT&C coverage calculation, data relay satellite system TT&C coverage calculation, relative desistence calculation in rendezvous and docking task, solar light environment calculation and so on. Finally, the characteristic point calculation method based on the global navigation satellite system is simulated.