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SPACE DEBRIS RISK ASSESSMENT AND PROTECTION SCHEME DESIGN BASED ON SPACE STATION

Abstract

With the gradual increase in human space exploration activities,it makes such rapid growth in the number of space debris, as the existing debris mitigation measure cannot reduce the amount of space debris effectively,it leads to increasing deterioration of Near-Earth orbit environment.China will build manned Space Station soon,so it will increase the manned space station orbiting risks undoubtedly,and even affect the safety of the astronauts.In order to ensure the survival of astronauts and the operation safety of space station, the space debris environment on the orbit of future space station is predicted in this paper, and the risk assessment of the collision between the space station and space debris is carried out. The impact risk assessment results of various types of space debris under different operating attitude of space station system are obtained.Combined with the design characteristics of space station structure, and the impact limit equation,carry out the passive protection scheme design of space debris for space station.For the three protection schemes proposed,through simulation analysis and physical experiment, the breakdown probability of space station is evaluated, and the total proposal of passive structure protection scheme suitable for space station is put forward. The results obtained in this paper can provide an important design reference for the determination of the protection scheme for China space station.