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Author: Dr. hang shi
Beijing Aerospace Technology Institute, China

Ms. Mengshan Du
Beiing Aerospace Technology Institute, China
Mr. Xiangyu Wu
Beiing Aerospace Technology Institute, China

A NOVEL X-RAY PULSAR-BASED NAVIGATION TECHNOLOGY

Abstract

article

A novel X-ray pulsar-based navigation technology

Hang Shi

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Abstract

X-ray pulsar-based navigation is a new type of astronomical navigation method. It can be used to provide navigation information such as time, position and attitude for near space, near earth orbit, deep space spacecraft/aircraft and even for interplanetary vehicle. Compared with the traditional navigation method, X-ray pulsar-based navigation is no longer limited by the geographical conditions and ground control stations, so it can achieve full orbit spacecraft autonomous navigation and the full orbit stability control signal.As space program around the world constantly launch, the autonomous navigation demand for different flight such as near space aircraft, near earth aircraft / spacecraft, satellite constellation / formation, deep space detector grows greatly. There is an urgent need for a new type of autonomous navigation.

A new pulsar detection mechanism and observation method based on recent exploration is provided and discussed, while research on high precision pulsar cycle stability detection technology and pulse radiation profile recovery method is introduced. By the method of autonomous celestial navigation model based on the new navigation principle, the reference information including space position, attitude, time and speed can be provided to spacecraft / aircraft, and thus the independent survivability and space perception ability can be greatly enhanced.The new X-ray pulsar-based spacecraft navigation method will subvert the traditional navigation method of aircraft, by getting rid of dependence on the ground base station and solving the navigation accuracy drops problem of traditional navigation products due to the long-term errors accumulation and drift of satellite constellation.

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