عنوان مقاله:

Investigating the relative motion of two satellites corresponding to the orbital collocation strategy

محل انتشار:

مجله علوم و مهندسی هوافضا, دوره 16, شماره 1 (سال: 1402)

تعداد صفحات اصل مقاله: 14

نویسندگان:

Fatemeh Amozegary - Faculty of New Sciences & Technologies, University of Tehran, Tehran, Iran

Amir reza Kosari - Faculty of New Sciences & Technologies, University of Tehran, Tehran, Iran

Mahdi Fakoor - Faculty of New Sciences & Technologies, University of Tehran, Tehran, Iran

خلاصه مقاله:

The ever increasing demand for placing satellites in the geostationary orbit has caused the revision and change of the conventional mechanism of allocating orbital slots. Therefore, collocation approaches and station keeping of several satellites with a common position have been developed to improve the utilization of the capacity of the geostationary orbit. This, in turn, leads to an increase in the complexity and sensitivity of the modeling, guidance, and control processes. However, new restrictions are added to the problem of maintaining a common location, such as maintaining the minimum separation distance between satellites to prevent possible interference. Employing a collocation strategy is essential, especially for effective control of high-demand orbital regions that will lead to space congestion.Controlling the relative motion of satellites by maintaining a safe distance between them is the main rule in collocation. This article investigates the problem of the relative motion of satellites corresponding to collocation strategies. Then, the results are implemented and compared using a solution based on geometrical modeling of relative orbit and the concepts of spherical geometry. In this regard, the relative orbital elements of the two satellites are calculated using the presented relative motion modeling. Also, the relative position of the satellites is obtained. The case studies and evaluations confirmed that the inclination and eccentricity separation strategies are suitable options for meeting the fuel consumption requirements and providing more space for collocated satellites than other strategies.

کلمات کلیدی:

GEO-orbital space, Relative motion Collocation, Collocation strategy, Geometric modeling of relative orbit