عنوان مقاله:

Centralized Path Planning for Multi-aircraft in the Presence of Static and Moving Obstacles

محل انتشار:

ماهنامه بین المللی مهندسی, دوره 33, شماره 5 (سال: 1399)

تعداد صفحات اصل مقاله: 11

نویسندگان:

M. M.irzaei Teshnizi - *Faculty of New Science and Technology, University of Tehran, Tehran, Iran*

A. Kosari - *Faculty of New Science and Technology, University of Tehran, Tehran, Iran*

S. Goliaei - *Faculty of New Science and Technology, University of Tehran, Tehran, Iran*

S. Shakhesi - *Faculty of Iranian Space Research Center, Tehran, Iran*

خلاصه مقاله:

This article proposes a new approach for centralized path planning of multiple aircraft in presence of the obstacle-laden environment under low flying rules. The problem considers as a unified nonlinear constraint optimization problem. The minimum time and control investigate as the cost functions and the maximum velocity and power consider as the constraints. The pseudospectral method applies as a popular and fast direct method to solve the constrained path planning problem. The three-degree-of-freedom nonlinear point mass equations of motion with realistic operational aircraft constraints consider through the simplified mathematical model. The fixed obstacle considers as a combination of spheres with different radius. Also, the moving obstacles consider as a sphere with a known radius and fly at a constant speed. The effectiveness of the proposed concept will be demonstrated by presenting four case studies with a different number of aircraft along with the static and moving obstacles in various scenarios to ensure safe and effective flights.

کلمات کلیدی:

Collision Avoidance, Moving Obstacle, Path planning, Pseudospectral method, Static Obstacle