عنوان مقاله:

Create a weather routing network in ocean navigation and verify it with a simple cost function

محل انتشار:

فصلنامه بین المللی مهندسی سواحل، فراسواحل و محیط زیست, دوره 8, شماره 3 (سال: 1402)

تعداد صفحات اصل مقاله: 14

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خلاصه مقاله:

Due to the need of the maritime community to reduce meteorological calculations on maritime routes, ship weather routing has attracted a lot of attention in recent years, both in the university and in the maritime industry. The problems in this field are finding the optimal route and speed of navigation for a certain voyage, taking into account the environmental conditions of wind and waves. Goals are usually considered to minimize operating costs, fuel consumption, or safety. The main methods used to solve the weather routing problem are the Isochrone method, dynamic programming, calculus of variation, use of routing, and exploration algorithms, while in recent years, artificial intelligence and machine learning applications have also increased. Most of these methods are well established and have not changed significantly over the years, although programs with a combination of these methods have been used. In this research first, the great circle route is calculated for the vessel between the departure and the destination positions, and using the Rhumb line method, the network points around the great circle route are created. Next, it is necessary to number the network points and network connections, and finally, using Dijkstra's algorithm and defining a cost function, the network efficiency is proved. The results and innovations of this research, the use of up-to-date methods in calculating the great circle route and turning points on it, creating minimal connections between network points.

کلمات کلیدی:

Maritime, Great circle, the Rhumb line, optimization, combined spherical trigonometry