

TOPSIS 방법을 기반한 연속적인 웨이포인트 생성 알고리즘에서 합리적인 선박 속도 채택에 관한 연구

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The adoption of reasonable ship's velocity in consecutive waypoint generation algorithm based on TOPSIS

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Key Words: Consecutive waypoint generation algorithm, TOPSIS method, criteria group, hypothetical situation.

1. Outline and research purpose

This study is an upgrade to the automatic collision avoidance system introduced by Gia Huy Dinh and Namkyun-Im in October 2017 at ISIS conference. Initial system did not consider changing own ship velocity in collision avoidance situation. This research is implemented for an adequate system, of which automatic action includes both alterations, course and velocity.

2. Research method

TOPSIS method is employed as the best solution for finding reasonable speed of own ship in avoiding action. This article develops a set of criteria for evaluating the results of the collision avoidance hypotheses action, from which ratings and choosing the most efficient hypotheses. The velocity of the giving-way vessel in the selected hypotheses action will be considered as the reasonable velocity for a practice action.

The set of criteria includes: Alteration of Ship Heading, Time for complement of avoidance action, saving energy, smoothness performance and time of overlap domain.

An example of head-on situation is implemented by 10 hypotheses actions under simulation program, TOPSIS method will find the best action.

3. Results and discussion

The results reached from simulation are ranked by TOPSIS method. Own ship's velocity was changed in each simulation. The best simulation is A9, the reasonable velocity chosen is 10 kn.

4. Conclusion

The contribution of this article is to develop a set of criteria for evaluating hypothetical situations of avoiding action. Basically, this set can be used with automatic collision avoidance systems using domain. The work of choosing the best option in hypothetical situation helps the officer get the optimal choices in altering course and velocity. Future studies will improve the calculation method, consider adding the necessary criteria as well as increasing the number of decision-makers in determining the weighted of criteria.

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