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论文

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舰载直升机系留座的布置优化

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Optimization Design of the Mooring Base of the Ship-based Helicopter

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摘要

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摘要 本文根据舰载直升机系留索的受力特点,推导出系留索的张力计算表达式,利用遗传算法对系留点的位置进行优化,得到了各海况下系留点的优化布局形式和系留索的张力值,最后对得到的结果进行综合分析比较,确定了最佳的系留座布局形式。

关键词: 舰载直升机 系留 遗传算法 优化 张力

Abstract: The ship-based helicopters are in complicated circumstances because of winds and waves. In this paper, the movements of the ship on the sea and the external loads on the helicopter on a ship are analyzed. The helicopter and the deck of the ship are treated as rigid bodies. Mooring the helicopter is realized usually by using cables. The cable is considered as a flexible element, and can be only subjected to tension. The forces of the cables are calculated by using two different methods. The expressions of the mooring cable tension calculation are derived. The locations of the mooring points are optimized by the genetic algorithm. Based upon the mathematic model and the genetic algorithm feature, the operator routine is designed. The programming language of MATLAB is applied the program design. According to the characteristics of the mooring cable, some added constraint conditions are taken into account for optimization. The optimum layout and the tension forces in the mooring cables are obtained for different sea conditions. Finally, the optimization results are found after making general comparison and analysis.

Keywords: carrier-based helicopter mooring genetic algorithm optimization tension

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