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A study of automatic hull lines fairing

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Summary: The present study shows an automatic ship hull form fairing method using an optimization technique. The hull form fairing is carried out by minimizing unfairness function represented with design parameters which define a hull surface form. In the actual hull form fairing task, a fair hull surface is obtained by fairing all cross-sectional curves such as frame lines, water lines and buttock lines. Therefore, in this study, a new unfairness function not for the hull surface but for the cross-sectional curves is defined. This new unfairness function for curves is defined with "Porcupine" distribution which is used as a guidance to detect the unfairness in the actual fairing task. Obtained frame line by minimizing the present unfairness function is fairer than one obtained by minimizing the curve strain energy which is commonly used for unfairness function. The unfairness function for whole hull surface is organized by summing the unfairness function of each cross-sectional curve with a weighting function. The faired hull surface obtained by present method has appropriate fairness for practical use.

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