

Automation of Savitsky's Method for Power Calculation of High Speed Vessel and Generating Empirical Formula

Authors : M. Towhidur Rahman, Nasim Zaman Piyas, M. Sadiqul Baree, Shahnewaz Ahmed

Abstract : The design of high-speed craft has recently become one of the most active areas of naval architecture. Speed increase makes these vehicles more efficient and useful for military, economic or leisure purpose. The planing hull is designed specifically to achieve relatively high speed on the surface of the water. Speed on the water surface is closely related to the size of the vessel and the installed power. The Savitsky method was first presented in 1964 for application to non-mono-hedric hulls and for application to stepped hulls. This method is well known as a reliable comparative to CFD analysis of hull resistance. A computer program based on Savitsky's method has been developed using MATLAB. The power of high-speed vessels has been computed in this research. At first, the program reads some principal parameters such as displacement, LCG, Speed, Deadrise angle, inclination of thrust line with respect to keel line etc. and calculates the resistance of the hull using empirical planning equations of Savitsky. However, some functions used in the empirical equations are available only in the graphical form, which is not suitable for the automatic computation. We use digital plotting system to extract data from nomogram. As a result, value of wetted length-beam ratio and trim angle can be determined directly from the input of initial variables, which makes the power calculation automated without manually plotting of secondary variables such as p/b and other coefficients and the regression equations of those functions are derived by using data from different charts. Finally, the trim angle, mean wetted length-beam ratio, frictional coefficient, resistance, and power are computed and compared with the results of Savitsky and good agreement has been observed.

Keywords : nomogram, planing hull, principal parameters, regression

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