A solution of an improper integral equation of ship wave resistance

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Abstract

Ship wave resistance had been a subject of continuous in depth study since the late 1800. The pioneer work on ship wave resistance was by Michell (1898) and followed by many studies thereafter. The ship wave equation derived and used by Michell is an improper integral form. Wigley (1926-1948) carried out further works extensively, improvised and solved the Michell ship wave resistance equation theoretically and experimentally using mathematical hull forms of thin ships. Wigley solved the equation with the assumption that the integral is convergent and errors in the remainders were appreciably negligible. Nevertheless the tendency of the ship wave resistance becoming divergent is obvious for hulls of larger angles of entrance. The objective of the paper is to present a solution for a divergent or an improper integral equation of ship wave resistance. **The results matched closely with experimental results and of better accuracy as** compared with theoretical results obtained from different methods performed by several other authors. This method of solution would be practical and useful engineering tool for the prediction of ship hull performance and optimization in terms of the wave resistance and hence the total resistance with the ultimate aim for application in ship powering estimates. © 2006-2017 Asian Research Publishing Network (ARPN).

Author keywords

Definite integral; Final root method; Improper integral; Michell integral; Ship wave resistance

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