9th Conference on Computational Methods in Marine Engineering (Marine 2021)
2-4 June 2021, Edinburgh, Scotland, UK

USE OF COMPUTATIONAL METHODS TO ADVANCE STEADY SHIP HYDRODYNAMICS

HOYTE C. RAVEN

Maritime Research Institute Netherlands
P.O.Box 28, 6700AA Wageningen, Netherlands
h.c.raven@marin.nl, www.marin.nl

Key words: Ship hydrodynamics, resistance and propulsion, hull form design, flow physics, CFD

ABSTRACT

This invited session focuses on the use of CFD methods to extend our knowledge of ship hydrodynamics, including ship hull and propulsor design trends and scale effects.

In the past, ship hydrodynamic design was based on experience and empirical information on hull form features determining the resistance and propulsion performance. Today, CFD predictions play an increasing role in the design process, and more and more complete and accurate predictions are made. But prediction alone does not lead to a better ship. Insight in the flow physics remains essential if we are to design more efficient ships.

Computational methods allow us to collect that insight and extend design knowledge much more effectively than has ever been possible in ship hydrodynamics. Many questions that in the past could just be answered by extensive model testing, or not at all, can now be studied using CFD methods.

This role of computational methods is the theme of the session. Papers are welcomed on CFD application studies that address the flow physics or design trends and the understanding of those derived from computational work; thus providing new information on classical naval architecture problems connected with ship resistance and propulsion.

Some examples of topics relevant to this session are:

- study of ship (transom) stern flow physics and design trends
- computational studies of effects of shallow water on ship resistance and propulsion;
- computational (and experimental) studies of hull roughness and fouling effects;
- studies of ship-propeller interaction; possibly including energy-saving devices.
- computational studies of scale effects on form factors, wake fields, wave resistance, appendage drag, …;
- etc.