Methodology for the detection of numerical anomalies in the use of BEM solvers

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ABSTRACT**:** The boundary element method (BEM) solvers WAMIT, NEMOH, and HAMS share similar computational frameworks and solution workflows, each relying on dedicated geometry, input, and configuration files. These tools can be efficiently executed via command-line interfaces, which are used to analyse the hydrodynamics of floating bodies within diverse marine industry applications. Despite their methodological similarities, each solver exhibits distinct numerical characteristics, capabilities, and limitations that may affect accuracy and computational efficiency. This paper presents a methodology for obtaining hydrodynamic coefficients using these widely adopted BEM codes, establishing a comparative analysis that considers their three main operational stages: pre-processing, processing, and post-processing. This iterative method can be employed in performance studies and for identifying numerical errors, primarily associated with the wetted surface integration for computing coefficients in both the frequency and time domains.