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APPLIED NEAR AND THROUGH FREE-SURFACE INTERACTIONS

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ABSTRACT

Advances in numerical methods have broadened out the applicability to cover a large range of free-surface interactions. The complications involved with variations in time scales, physical modelling and spatial scales was not lost on the early integrators of free-surfaces with computational fluid dynamics. These complications have tended to result in analyses centred on deeply submerged (Reynolds number dominant (Ferziger & Peric, 2002)) or centred on gravity wave production (Froude number dominant (Doctors & Beck, 1987)).

However, advances in numerical tools and complimentary and validating experimental tools, used in proximity to the free-surface, have integrated predictions for maritime engineering situations with both submerged variations in pressure distribution and free-surface proximity effects (Conway, Ranmuthugala, & Binns, 2013; Pistani, Olivieri, & Campana, 2006; Young & Brizzolara, 2013). These cases have encompassed near surface submersible designs extending to surface piercing submersible designs (such as AUVs with through surface communication) with the same numerical solutions applied to hydrofoil designs.

The aim of this mini-symposium is to bring together solutions on predictions for near and through surface interactions. What physics models are essential? How are Reynolds, Froude and Weber number variations being controlled? How are researchers dealing with wide variations in temporal and spatial scales? What unsteady methods are being employed? are all questions that the research community are tackling, this mini-symposium will provide an opportunity to seek out common solutions.

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