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DEVELOPMENT OF AN IMPULSE SOURCE-BASED WAVE-CURRENT INTERACTION (WCI) MODEL

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The interaction between waves and currents is a well-known problem in the ocean and marine engineering sector. A first description of WCI was delivered by [1]. Since then, numerous studies have been performed using different analysis tools ranging from analytical descriptions to experimental tank testing and numerical models.

With the increased interest in marine renewable energies, and tidal energy conversion in specific, WCI slowly attracts the attention of researchers in this field. The main analysis tool here are scaled experimental test. Such tests are prone to scaling effects, undesired influences of measurement equipment and test environment as well as to significant costs.

In times of increasing computational power, CFD-based numerical wave tanks (CNWT) are a viable alternative to experimental tank tests, avoiding the aforementioned problems. However, only few CNWTs models able to simulate WCI are found in the literature[2].

This study presents an impulse source-based WCI model for CNWTs. Waves and currents are simultaneously generated through an additional source term added to the Navier-Stokes equation, base on the implementation in [3].

Results are presented for current-only and WCI simulations. For validation, the latter will be compared to literature benchmark cases.

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