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# Numerical modelling of the hydrodynamic response of a dual-chamber fixed Oscillating Water Column Wave Energy Converter through the meshless DualSHPhysics method

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A numerical model of a dual-chamber Oscillating Water Colums (OWC) Wave Energy Converter (WEC) is built through the DualSPHysics software. This code is based on the Smoothed Particle Hydrodynamics (SPH) model, a Lagrangian meshless method where particles represent the flow, interact with structures, and exhibit large deformation with moving boundaries. A one phase approach – only water - is chosen in order to limit the computing time, as it increases with the total number of particles, and the power take-off (PTO) of the system is modeled by the force applied by a vertical linear spring link on a floating plate inside the chamber. The force formula and coefficients are described, discussed and tuned for various wave states to optimize the model. Validations against experimental data received from previous tests in wave flumes are performed. The floating plate heave of the numerical model is compared with the experimental free surface elevation. The result analysis establish that DualSPHysics can be considered as a reliable tool to model a fixed OWC WEC. Subsequently, this model will be mimicked and adapted for a floating dual-chamber OWC WEC performance.

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