Spectral Element FNPF Simulations of a Heaving Point Absorber

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ABSTRACT

We present a fully nonlinear potential flow (FNPF) model for simulation of wave-body interaction in three spatial dimensions (3D) and apply it to the case of an axi-symmetric point absorber. The FNPF model is discretized is space by a C^0 spectral element method (SEM) using high-order prismatic - possibly curvilinear - elements. This SEM-FNPF model is stabilized following the work presented in [2] and the wave-body interaction is solved by the acceleration potential method [4]. Following the work of [3] the model is based on an Eulerian formulation and the direct discretization of the Laplace problem makes it straightforward to handle accurately floating bodies. The FNPF-SEM approach has been illustrated to have the potential to deliver a computationally efficient tool for wave-body interaction [3]. In this work we apply the model to the 2nd test case of the OES Task 10 project: a heaving point absorber made up of surface piercing body with a cylinder on top, and a conical frustum on the bottom. This case was experimentally investigated in [1]. We present computations of diffraction, radiation and decay tests as well as heave response in regular wave.

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