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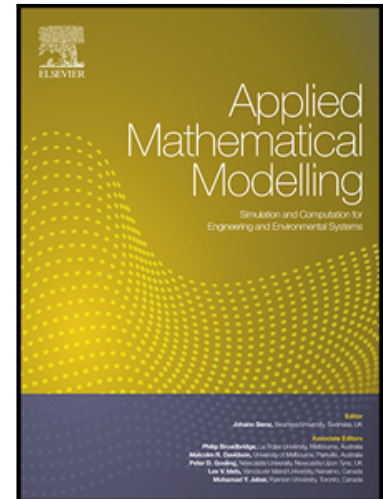
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Dynamic modeling and simulations of the wave glider

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Highlights:

- A 4 degree-of-freedom mathematical model of the wave glider is established using Newton-Euler approach.
- A time domain simulation program is developed using Simulink.
- Motion simulation of the wave glider is conducted under several typical sea states.
- The wave glider's motion behavior is analyzed in detail.

Abstract

Wave glider is a new wave-powered autonomous marine vehicle, which is composed of a submerged glider connected to a surface floater via a tether. Such an advanced vessel is designed to harvest energy in ocean surface waves to generate forward thrust. Equipped with solar panel and battery as well as some dedicated sensors, the wave glider is able to achieve long duration missions via sea-side control. In this paper, a 4-DOF (degree-of-freedom) mathematical model of the wave glider is established using Newton-Euler approach. The second-order wave drift force on the horizontal plane and the first order wave force on the vertical direction are considered. The hydrodynamic parameters were calculated using the potential flow theory and empirical formula. Furthermore, motion simulation of the wave glider with respect to the sensitivity analysis to some

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