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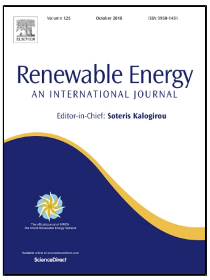

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A parameter study and optimization of two body wave energy converters

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Abstract

This paper studies the multidisciplinary nature of two body wave energy converters by a parametric study based on the Taguchi method which helps to understand the effect of different dependent parameters on the wave energy conversion performance. Seven different parameters are analyzed and their effect on the maximum captured power, resonance frequency and bandwidth is studied. An interesting comparison between a cylindrical submerged body and a spherical one was made in terms of the system's viscous damping and hydrodynamics. The best system parameter combinations based on the maximum output power, best resonant frequency and frequency bandwidth were identified from the outcomes of the Taguchi method and optimized to capture the maximum power to operate in the specific (Australian) sea regions where the waves' frequencies are relatively low. This paper should provide a guideline for designers to tune their parameters based on the desired performance and sea state.

Keywords: parameter, optimization, two body wave energy converters, power, bandwidth, Taguchi method

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