

Abstract

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Analytical Investigation and Experimental Validation of an Inverted Cup Float Used for Wave Energy Conversion

World energy demand is increasing at an alarming rate and producing electricity from alternative or renewable energy sources is becoming necessary. There are many technologies to extract electric energy from sea waves such as: the oscillating water column, the point absorber, the overtopping system and the bottom hinged system. Many researchers are focusing on modeling the floating point absorber, which is thought to be the most cost effective technology to extract energy from sea waves. This paper is mainly work on a new design of float and the analytical analysis of its performance. This float consists of two parts a hollow cylinder and an inverted cup fixed to its bottom. The float is initially submerged in water with sufficient submergence float. Water rises up due to the wave action and the float will follow the water motion which reduces slamming of the float. When the water level s, the water enclosed in the inverted cup is exposed to a negative pressure which help the float down to follow the water wave motion without slamming. In this work, an analytical model is used MATLAB SOFTWARE to simulate the system of energy conversion. Moreover, a comparison for this model of the simulation results with experimental data to validate the model.