

Abstract

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Numerical and Experimental Assessment of an Inverted Cup Float Used for Wave Energy Conversion

World energy demand is increasing at an alarming rate and producing electricity from alternative 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 over topping system and the bottom hinged system. Many researchers focused on modeling the floating point absorber, which is thought to be the most cost effective technology to extract energy from sea waves. This work is focusing 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. As water rises up due to the wave action 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 will experience negative pressure which will help the float down to follow the water wave motion without slamming. In this work, an analytical model was used MATLAB software to simulate the system of energy conversion. Moreover, a comparison for this model of the simulation results with experimental data validates the model.