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Numerical studies on the movement and structural stability of IPMC system operating in the ocean environment

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It is a well-known fact that the ocean's waves contain an infinite potential energy source which has resulted in the development of a wide variety of offshore projects all over the world. In this research, we applied ionic polymer metal composites (IPMCs) to absorb the kinetic energy of the ocean waves to generate electricity. Experimental results showed that the IPMC materials application has many advantages since they are soft and durable; as a result, they may faster respond to every wave's parameters such as frequency, amplitude, wavelength, etc. This paper shows a simulation model of the energy harvesting system based on IPMC assembled in the ocean by using AQWA software within ANSYS Workbench. The simulation results focused on the movement and the structural stability of the system design in the ocean wave environment to bring out the movement and deformation of IPMC which affect directly to the power performance output. The experimental test under real sea condition was also performed to analyse the electrical performance harvesting from IPMC system.

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