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Optimal control of wave energy harvesting devices using the reinforcement learning technique NISSI SUPRIYA KONDA, KOUROSH SHOELE, Florida State University — It is well accepted that the known sources of fossil fuels in the world are depleting very fast and there is an increasing need to harvest energy from renewable resources. In the form of waves and currents, ocean is a tremendous source of renewable energy.Harvesting this energy from these resources has been a subject of interest from many centuries. A wave energy converter (WEC) is defined as a device that converts the kinetic and potential energy associated with a water surface wave into useful mechanical and electrical energy. One promising technique is to employ control methods for the wave energy converters to increase their energy capturing efficiency. Toward this, in this study, we employ the reinforcement learning technique to learn the optimal geometry and modify the parameters of a WEC device based on the incoming waves. A multi-body, time-domain simulation tool created for the simulation of WEC devices is used to evaluate the WEC performance. The WEC device dimensions and Power Take Off (PTO) parameters are used as controlling parameters within the reinforcement learning technique to determine which parameters maximize the constructive interaction between the environment and the device considering the device constraints.

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