

Application of a Neural Network Predictor/Controller to Dynamic Positioning of Offshore Structures

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Abstract

This paper describes an auto-regressive moving average (ARMA) functional-link neural network predictor/controller for dynamic positioning of offshore structures. The ARMA neural network predictor acquires the knowledge about the system through an on-line training using a small number of samples of the latest system status measured on board of the structure. The trained ARMA functional-link neural network is used with an optimal controller to control the output of the system. The accuracy and robustness of the ARMA predictor are demonstrated through the numerical simulations of two ship maneuvers. The neural network predictor/controller is applied to the dynamic positioning (station-keeping) of a ship in a uniform current with and without external environmental disturbances. The results of the numerical simulations are very satisfactory.

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