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Wave Forces on Offshore Structures: Nonlinear Wave Diffraction by Large Cylinders

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ABSTRACT

A nonlinear theory of wave diffraction is presented and used to evaluate the forces exerted on a cylinder of large diameter. A perturbation technique has been used to solve the problem with the inclusion of second-order terms. Analytical solutions are expressed in the form of an integral, and a numerical technique is applied to solve the resulting integral equation with satisfaction of all necessary hydrodynamic boundary conditions including surface and radiation boundary conditions. Predictions of the present analysis are compared with the experimental data. The comparison shows excellent agreement.

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