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Symmetric Finite-Amplitude Rotational Water Waves

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ABSTRACT

Two forms of a two-dimensional streamfunction solution for symmetric periodic water waves on a fluid with a vertical distribution of vorticity are presented. The magnitude of the vorticity varies linearly with the magnitude of the streamfunction, while remaining constant on a particular streamline. The analysis utilizes a numerical perturbation technique, which converges rapidly to a wave of given height and period in water of a specified depth with a given vorticity distribution. Computed results show the influence of the vorticity on the wavelength and crest elevation of the wave.

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