



Abstract View

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Covariance Functions and Spectra of a Random Wave Field

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ABSTRACT

Covariance functions and spectra of components of fluid particle velocity are obtained, taking into consideration the effects of free surface fluctuations, for a Gaussian, stationary and homogeneous random gravity wave field in deep water, using infinitesimal wave solutions. Approximate representations of the covariance functions and spectra are also derived. It is shown that the covariance functions and spectra presented in this paper differ from those when the effects of free surface fluctuations are ignored, especially at, around and above the equilibrium surface.

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