

عنوان مقاله:

Derivation of depth integrated energy conservation equation for multidirectional linear waves

محل انتشار:

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خلاصه مقاله:

In this paper Reynolds transport theory is applied to obtain a new form of energy conservation equation (ECE) for irrotational monochromatic water waves. The depth integrated form of ECE for free surface flow is obtained by applying dynamic and kinematic free surface and bottom boundary conditions together with mass conservation equation. It should be noted for the special case of irrotational linear waves mild slope equation is derivable from depth integrated ECE. Two equations are derived in terms of real and imaginary parts of the wave amplitude from depth integrated ECE, assuming an irrotational, stationary, monochromatic and multidirectional wave field. It is shown that these equations are directly convertible to geometrical optics equations for unidirectional waves. In comparison with the stationary monochromatic version of energy transport equations governing spectral wave models, the capability of dealing with multidirectional refracting diffracting and reflecting waves are the clear merits of the new equations

کلمات کلیدی:

Reynolds transport theory, Energy conservation equation, Mild slope equation, Geometrical optics, Spectral wave model

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