APCOM & ISCM
11-14th December, 2013, Singapore

A new approach to use DRBEM with discontinuous elements in water waves.

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As a popular phase resolved equation, the original Mild Slope Equation (MSE) was derived by Berkhoff in 1972, assuming a linear constant depth solution of Laplace equation to be locally valid and integrating over the depth. The result is a two-dimensional elliptic equation describing linear wave scattering over moderately varying bathymetry. In the present paper, MSE is solved using the well-known Dual Reciprocity Boundary Element Method (DRBEM). As a new contribution in this work the implementation is done by exploiting discontinuous elements within Boundary Element Method concept. Convergence rates as well as the solution stability of high resolution discretized boundaries are investigated and the efficiency of the method as well as the quality of the results compared to its counterpart solved in the literature. Capability of the proposed method is addressed for some practical and engineering applications, e.g. modeling refraction/diffraction around islands and in vicinity of offshore breakwaters.

Keywords: Mild-slope equation, diffraction, refraction, dual reciprocity boundary element, discontinuous elements.