

A COUPLED FINITE ELEMENT-BOUNDARY ELEMENT (FEM-BEM) FORMULATION FOR THE MILD SLOPE EQUATION: AN IMPROVEMENT FOR OPEN AND PARTIAL REFLECTING BOUNDARIES

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The definition of the open boundary condition in coastal waters governed by the Mild Slope Equation is a complex problem which has been studied by many authors [1, 2, 3]. In this work, a BEM-FEM coupling is applied to improve the numerical solution of problems with open or partial-reflection boundary conditions. The region of interest is modeled using the FEM, connecting the open and partial reflecting boundaries to an infinite BEM domain. The proposed methodology uses the normal derivative of the velocity potential as a variable of the problem. Better accuracy is attained compared to first and second order approaches preserving the advantage of modelling the region of interest with finite elements. Several examples are solved with the presented method and the solution is compared with existing analytical and numerical solutions. The solution is also compared with other open boundary condition formulations in order to illustrate the advantages of BEM-FEM coupling.

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