The modified mild slope equation of [5] is solved using a combination of the boundary element method (BEM) and the finite difference method (FDM). The exterior domain of constant depth and infinite horizontal extent is solved by a BEM using linear or quadratic elements. The interior domain with variable depth is solved by a flexible order of accuracy FDM in boundary-fitted curvilinear coordinates. The two solutions are matched along the common boundary of two methods (the BEM boundary) to ensure continuity of value and normal flux. Convergence of the individual methods is shown and the combined solution is tested against several test cases. Results for refraction and diffraction of waves from submerged bottom mounted obstacles compare well with experimental measurements and other computed results from the literature.

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