

## A Novel Boundary-Type Meshless Method for Solving the Modified Helmholtz Equation

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**Abstract:** This paper presents a novel boundary-type meshless method for solving the two-dimensional modified Helmholtz equation in multiply connected regions. Numerical approximation is obtained by the superposition principle of the non-singular basis functions satisfied the governing equation. The advantage of the proposed method is that the locations of the source points are not sensitive to the results. The novel concept may resolve the major issue for the method of fundamental solutions (MFS). In contrast to the collocation Trefftz method (CTM), the Trefftz order of the non-singular basis functions can be reduced since the multiple source points are adopted. To solve the physical problems in a doubly and multiply connected regions, the boundary-type meshless method with the incorporation of the domain decomposition method (DDM) is proposed. The numerical examples for the validation are conducted including simply, doubly, and multiply connected regions. Numerical results demonstrate that the proposed method is highly accurate and computationally efficient for modeling modified Helmholtz equation. The results also reveal that it resolves the restrictions of the MFS and the CTM for the application in the engineering problems.