

The Method of Fundamental Solutions for the Harbor Oscillation Problem

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Summary

The harbor oscillation problem, which is governed by inhomogeneous Helmholtz equation, is analyzed by the combination of the method of fundamental solutions (MFS) and method of particular solutions (MPS). The governed inhomogeneous Helmholtz equation is derived from the mild-slope equation and potential theory. The numerical solutions of the velocity potential of the harbor oscillation problem are decomposed as the homogeneous solution and the particular solution. While the particular solution is obtained by the MPS, the MFS is adopted to analyze the homogeneous solution. The particular solution is expressed as the linear combination of radial basis function, as the homogeneous solution is expressed by the fundamental solutions. Since the MFS and the MPS can really get rid of the mesh generation and numerical quadrature, the proposed meshless scheme will form an efficient numerical tool for analyzing the harbor oscillation problem. Some numerical examples will be provided to demonstrate the ability and accuracy of the proposed scheme.

