SH-wave scattering problem of an arbitrary shaped hill by using the boundary integral quadrature method

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In this paper, the SH-wave scattering problem of an arbitrary shaped hill is solved by using the boundary integral quadrature method (BIQM). By introducing the adaptive exact solution, the singular integral can be efficiently calculated. In this way, the calculation of the solid angle is not required. The adaptive exact solution must satisfy the two-dimensional Helmholtz equation and the continuity conditions across the boundary. After using the Gaussian quadrature and parametric representation to the contour integral and boundary contour, respectively, the boundary integral equation is nothing more than an algebraic equation. Therefore, the BIQM is a meshless method. For solving the SH-wave scattering problem with a convex hill, an artificial interface is required to introduce at the bottom of the hill. The original problem is decomposed into a half-plane problem and an interior problem. By using the image method, the traction-free boundary condition on the ground surface can be automatically satisfied. The collocation point located on the ground surface is not required. Numerical results show the influence of the incident frequency and incident angle for the displacement amplitude on the ground surface. Finally, the focusing phenomenon is also observed.

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