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modeling of scattering from targets in an oceanic waveguide using kirchhoff/diffraction method

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The target scattering model in an oceanic waveguide is presented. The target scattered pressure field is formulated using the generalized Green's function method [F. Ingenito, J. Acoust. Soc. Am. 82, 2051-2059 (1987)]. The concept of Kirchhoff/diffraction method is introduced in order to simplify the Fredholm integral equation. In numerical analysis, complex target is divided into numerous polygon facets, whose analytic solution for scattered field is derived based on the waveguide solution by the ray or normal mode theory. This solution is used in constructing the target scattered field for complex target. Comparison between ray and normal mode based target scattering model is shown. Finally discussion for conditions of the source/receiver and target which improves the numerical efficiency is given.