The time-domain scattering by the elastic shell in a two-layered unbounded structure

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Abstract

The subject of this research is the time-domain scattering problem for a three-dimensional layered elastic shell submerged in a two-layered fluid separated by an unbounded rough surface. The essence of the problem is to model the scattering interaction between the given elastic shell and some incident wave in a two-layered medium. Using the exact transparent boundary condition (TBC), we reformulate the unbounded scattering problem into an equivalent initial-boundary value problem. The well-posedness is proved for the problem by the Laplace transform and variational method in the s-domain. Moreover, we show that the reduced problem has a unique weak solution by the energy method. The priori estimates with explicit dependence on the time are derived for the acoustic pressure and the elastic displacement in the time domain.

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