

SLOW GENERALIZED WAVES AND GENERATION OF VORTICAL STRUCTURES IN ACOUSTICS IN LAYERED MEDIA

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ABSTRACT

The classical description of a sound field in Pekeris waveguide contains only the divergent waves satisfying to boundary conditions and conditions of radiation. The article offers the solution with the generalized normal waves, which are the combination of divergent waves and converging waves of feedback. The solution continues into half-space with formation of horizons of total internal reflection (TIR), corresponding to Newton hypothesis. In the layered environment the complex angular spectrum of a source excites the generalized forms of wave movement, such as the slow generalized waves, having a discontinuity on horizon of a source or on horizons of TIR. Propagation of the generalized waves is attended by generation of a vortex component of an intensity vector both on horizons of total internal reflection and on horizon of a source. The sound field on these horizons keeps a local continuity only on impedance and continuity on pressure and vertical component of particle velocity vector on the average. Theoretical results are in good conformity with experimental researches of the slow generalized wave on boundary of two liquid media and researches of a vortex component of an intensity vector in the shallow sea.

Keywords: Pekeris boundary problem, layered media, complex angular spectrum of source, zero-order mode, vortical component of intensity vector.

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