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SECONDARY SPECTRAL ANALYSIS AND ITS APPLICATION IN HYDROACOUSTICS IN THE INFRASOUND FREQUENCY RANGE

N.V. Zlobina, S.B. Kasatkin

The non-self-adjoint model formulation, taking into account the energy exchange between the waveguide and the half-space, is physically and mathematically correct when solving boundary value problems for open systems such as layered waveguides loaded onto the half-space. In this model formulation, the solution to the boundary value problem is described by the eigenfunctions of two adjoint operators, which are diverging waves and converging recoil waves, with their possible mutual transformation at the horizons of total internal reflection. New properties of the generalized solution constructed in the non-self-adjoint model formulation manifest themselves to the greatest extent in the infrasonic frequency range when using a scalar-vector description of the sound field. In this frequency range, the small-scale vortex component of the intensity vector becomes dominant in the total sound field, modulating the potential component of the intensity vector, isolated by the methods of primary spectral analysis. This paper analyzes the possibility of isolating the modulation component using secondary spectral analysis methods to improve the noise immunity of receiving systems based on combined receivers.

Keywords: non-self-adjoint model formulation, combination waves, generalized (hybrid) waves, longitudinal resonances, transverse resonances, generalized Brewster wave, combined receiver.

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About the authors

ZLOBINA Nadezhda Vladimirovna, Chief Researcher, Dr. Sc.
M.D. Ageev Institute of Marine Technology Problems Far East Branch Russian Academy of Sciences
Address: 5a, Sukhanov Str., Vladivostok, 690950
Research interests: fundamental and applied hydroacoustics
Phone: 7(423) 243-25-78
E-mail: zlobina@marine.febras.ru
ORCID: 0000-0003-3314-2163

KASATKIN Sergey Borisivich, Leading Researcher, Ph. D.
M.D. Ageev Institute of Marine Technology Problems Far East Branch Russian Academy of Sciences
Address: 5a, Sukhanov Str., Vladivostok, 690950
Research interests: setting up marine experiments, spectral processing, glider operation in shallow waters
Phone: 7(423) 243-25-78
E-mail: bigcezar@mail.ru
ORCID: 0000-0002-0945-8355