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Biography+Email Address

Dr. XIAOLEI LI is currently an associate professor and master's supervisor of Ocean Technology College of Ocean University of China, an outstanding young scientist of Shandong Acoustical Society, and a director of Shandong Acoustical Society. He received his Bachelor of Science degree from Ocean University of China in 2013 and his Doctor of Science degree from Ocean University of China in 2019. In 2019, he joined Ocean University of China to engage in Marine acoustics research. The current research direction is environmental adaptive detection, mainly focusing on the passive detection of underwater targets, and is committed to combining deep learning methods and physics knowledge to solve passive detection problems in complex Marine environments. At present, he has published more than 40 academic papers, including 13 papers as the first author and corresponding author in JASA, IEEE Transitions on Signal Processing, Ocean Engineering and other international authoritative journals. He was invited to give conference reports and special invited reports at the Underwater Acoustics Branch of the Acoustical Society of China, the National Acoustics Conference, and the International Conference on Information Processing of Marine Science and Technology (ICIPOST) for many times. He has won the Excellent Paper Award of the Acoustical Society of China Youth Forum and the Best paper Award of ICIPOST.

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Speech Title (English):

Robust Source Depth Estimation and Sound Speed Profile Reconstruction in Range-Independent Waveguides Using Orthogonality-Constrained Modal Search

Speech Abstract

An method is presented for joint sound-speed-profile (SSP) inversion and source-depth estimation for a stationary source using a partial-depth vertical linear array in a shallow-water waveguide. The method combines orthogonality-constrained modal search (OCMS) with an empirical orthogonal function (EOF) parameterization of the SSP. Normal-mode parameters are estimated from array data and used to construct a polarity-compensated depth ambiguity function. The objective function is defined as the Kullback–Leibler divergence between the normalized ambiguity function and a Dirichlet-kernel-like reference. A differential evolution scheme is used to optimize the EOF coefficients and source depth. Simulations examine the effects of random initialization, signal-to-noise ratio, array aperture, element number, and source depth. Results indicate that source-depth estimation is robust, whereas SSP inversion is more sensitive to initialization and modal-amplitude mismatch. Application to Yellow Sea experimental data confirms the practical feasibility of the proposed method.