

REGISTRATION OF MODULATION CHARACTERISTICS OF SEA OBJECTS' NOISE EMISSION

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One of the most important properties of underwater marine objects is their stealthiness. The underwater noise of a marine object is its deceptive factor. By analyzing the characteristics of the noise of a marine object, it is possible to determine the class of the marine object and its movement patterns. To improve the efficiency of detecting the primary field of low-noise underwater objects, it is necessary to expand the range of measured characteristics, including spectral and modulation characteristics. This article focuses on the modulation characteristics of the primary hydroacoustic field of a marine object, which were experimentally obtained in a shallow sea. Modeling of the acoustic field created by a point source of a broadband signal in a marine waveguide confirmed the formation of frequency-space modulation of a broadband signal in a shallow water area due to the interference of the direct and reflected signals from the sea surface. The modeling showed that in order to register the frequency-space modulation of a broadband signal in a shallow water area at small traverse distances of a marine object, it is necessary to use receivers distributed in the vertical plane. It has been shown that it is possible to register the modulation characteristics of the noise emission of marine objects in the form of discrete components of the demodulated signal spectrum using homomorphic filtering based on the signal's cepstral processing.

Keywords: primary hydroacoustic field, frequency-space interference, modulation characteristics, cepstral signal processing, and homomorphic filtering.

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