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PROBLEM-ORIENTED INTEGRATED MOTION CONTROL SYSTEM AND DYNAMICS OF A HYBRID AUV IN THE UNDERWATER NOISE CONTROL MODE

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The functional structure of the motion control system and the dynamics of a hybrid autonomous underwater vehicle (HAUV) are considered during operational monitoring of the noise field in the sea. To organize the movement of the HAUV, which consists of several stages, a control complex is used that ensures the fulfillment of the specified requirements for the dynamics of the vehicle and the conditions for effective measurements of the parameters of the noise field using a scalar-vector receiving system. Particular attention is paid to the correct description of mathematical models of the vehicle dynamics, propulsion and steering complex, buoyancy and moment of stability control systems. Optimization of the operation of the HAUV in the acoustic station mode is carried out through model and experimental adjustment of the parameters of these systems, taking into account the features of their technical design. When analyzing its structure, hydrodynamic characteristics and dynamic processes, the MMT-300 AUV was adopted as a prototype of the HAUV. The results of a computational experiment to evaluate the characteristics of the control complex in all modes of movement of the vehicle in the process of monitoring the noise environment are presented.

Keyword: hybrid autonomous underwater vehicle, underwater noise environment, acoustic station, dynamic model, buoyancy control system, moment of stability control system, propulsion complex.

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