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STABILIZATION SYSTEM OF AUV WITH ADDITIONAL THRUSTER TO COMPENSATE FOR DYNAMIC EFFECTS FROM MULTILINK MANIPULATOR

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The article describes a new synthesis method of automatic stabilization systems of autonomous underwater vehicles (AUV) in the hovering mode equipped with multilink manipulators (MM). The proposed method involves the installation of an additional thruster on the AUV, located on the same axis of rotation with the first link of the manipulator above the center of buoyancy on an outrigger fixed on a rotary platform. It expands the original propulsion and steering system (PSS) and allows mainly to compensate for the effects from the MM, leading to displacements of the AUV at the angles of roll and pitch. Considering the features of the thrusters layout, control signals of the PSS are formed to compensate for the dynamic effects exerted on the AUV by the MM moving in a viscous medium, whose grip can perform contact operations with target objects. At the same time, both the thrust of the additional thruster and the angle of rotary platform are controlled.

The results of studies of the synthesized AUV stabilization system by numerical simulation in Matlab/Simulink with visualization in the CoppeliaSim simulator showed its operability and high efficiency when performing manipulation operations.

Keywords: autonomous underwater vehicle, stabilization system, propulsion and steering system, contact operations, multilink manipulators, hovering mode.

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