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ON USING A TETHERED-TYPE UNDERWATER VEHICLE IN JOINT MOTION WITH A SUPPORT VESSEL

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The efficiency of using tethered underwater vehicles depends on the compliance of the propulsion and steering complex (PSC) characteristics with the values required to compensate for the reaction of the communication cable with the supporting vessel. The article presents an assessment of the requirements for the traction characteristics of the PSC, which provides maneuvering of a remotely operated underwater vehicle (ROV) relative to a carrier or an underwater depressor when moving alongside an extended bottom object. The assessment is based on the results of calculating the tension of the communication cable (CC) in the flow caused by the joint motion of the "support vessel-depressor-ROV" tethered system. The ROV's body and CC hydrodynamic resistance jointly determine the requirements for the traction characteristics of the PSC and the energy supply system of the complex as a whole. An algorithm based on the equation of a chain line and numerical integration of the equations of an inextensible flexible thread is proposed to calculate the tension of the CC of the underwater tethering system in a stationary flow. Two variants of using the proposed methodology for calculating the tethered system are considered:

– a single-link system consisting of "ROV – umbilical cable-communication with the vessel";

– a two-link system consisting of "ROV – umbilical communication cable – passive depressor – cargo-carrying cable-communication with the vessel".

Keywords: underwater tethering system, remote operated vehicle, passive depressor, steady motion, communication cable, chain line, equation of flexible inextensible thread

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