

CONTROL ALLOCATION APPROACHES FOR OVER-ACTUATED UNDERWATER VEHICLES: A BRIEF REVIEW

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There are various approaches to formulate the motion control problem for an unmanned underwater vehicle. An underwater vehicle can be considered as a single controllable object, that includes the dynamics of a rigid body, and the dynamics of actuators. At the same time, there are approaches aimed to divide the problem into two independent ones. In the first one, the problem of the vehicle control is solved, the second one solves the problem of allocation the control commands to the effectors of the propulsion system. The article provides an overview of various approaches to solving the control allocation problem for an underwater vehicle. Various approaches and methods of solving the problem for various types of propulsion systems are shown. Examples of software are presented that allow to numerically solve the problem in the formulations of quadratic optimization and model predictive control. The examples of problems that have not yet been fully resolved are given.

Keywords: underwater vehicle, vehicle control, control allocation, thruster, rudder, propulsion system, model predictive control allocation, dynamic allocation

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Recommended citation:

Kostenko V.V., Tolstonogov A.Yu. CONTROL ALLOCATION APPROACHES FOR OVER-ACTUATED UNDERWATER VEHICLES: A BRIEF REVIEW. *Underwater investigation and robotics*. 2021. No. 1(35). P. 4–17. DOI: 10.37102/1992-4429_2021_35_01_01

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