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METHOD FOR CORRECTION OF WORKING TOOL TRAJECTORIES OF MULTI-LINK MANIPULATOR OF UNMANNED UNDERWATER VEHICLE

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The article is devoted to a new method of correction the trajectories of working tools (WT) of multi-link manipulators (MM) installed on unmanned underwater vehicles (UUV), based on data obtained during recognition of a special graphic marker pre-fixed near the MM WT. The proposed method involves the use of technical vision systems (TVS) to identify the position of the marker and then compare it with the position calculated using the solution of the forward kinematics (FK) for this MM. These calculations are performed on the basis of information on generalized coordinates of MM obtained from sensors located in its degrees of freedom. Thus, by comparing the two spatial positions of the WT in real time, a correction vector is calculated that allows to clarifying the desired trajectory of the MM WT. The research of the developed method was carried out using numerical modeling in Matlab/Simulink and Unity, as well as full-scale experiments using MM and TVS developed in the IMTP of the Far Eastern Branch of the RAS. The obtained results indicate that the method presented in the work increases the accuracy of determining the position of the WT MM during manipulation operations.

Keywords: unmanned underwater vehicles, trajectory, working tool, technical vision system, manipulation operations, multi-link manipulator, graphical marker

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