

METHOD OF AUTOMATIC DOCKING OF UNINHABITED UNDERWATER VEHICLES WITH UNDERWATER PLATFORMS USING ONBOARD MULTI-LINK MANIPULATORS

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The article proposes a new method for automatic docking of uninhabited underwater vehicles (UUV) equipped with multi-link manipulators (MM) with underwater docking platforms (DP), which can have an arbitrary spatial orientation. This method involves attaching MM grip-tool to a simple mount (rod or beam) that is part of DP, followed by docking the UUV by sequential changing the configuration of the MM. At the same time, taking into account the current relative position of DP and UUV, the desired MM grip-tool movement trajectory with its variable orientation is automatically formed in such way that UUV body perform the necessary movements in the direction of DP. The forces and moments that can lead to the docking operation failure will unavoidably arise at MM grip-tool on performing the docking trajectory. Therefore, it is proposed to compensate these negative dynamic effects, calculated in real time, utilizing UUV thrusters. The results of numerical simulation in Matlab/Simulink have shown the efficiency and effectiveness of the proposed method.

Keywords: uninhabited underwater vehicle, automatic docking, mathematical model, multi-link manipulator, underwater basing, docking platform.

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