Thesis for the *Master of Science*


# Torque Distribution based on Real-Time Weighting Matrix Optimization between AUV and Underwater Manipulator


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# ABSTRACT

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On the seabed, there are resources with various possibilities of utilization, and various underwater robot technologies have been developed to utilize them. Among them, underwater valve control technology that is frequently used in oil and gas mining has also been studied. In the previous study, a study was conducted to lower the torque of the joint by distributing the joint burden to the robot body during the valve operation.

However, this study did not discuss ways to further reduce joint torque. In this study, based on the Taguchi method, we proposed a new algorithm that can reduce the torque of the joint in changing environment by determining the weighting matrix based on sensor values in real time.

In order to prove the effectiveness of this algorithm, iterative experiments of the algorithm of this study and the case of fixed weighted matrices were performed in a real water tank. Therefore, the effectiveness of this algorithm was proved by observing that the maximum torque of the manipulator joint is lowered by 35~55% than the valve work with the existing fixed weight matrix.