

Abstract: Fuzzy Control of State Feedback Modules for Tracking Way-Points of Autonomous Underwater Vehicle

Soon T. Kwon^{*}, Dong H. Shin^{**}, Sang H. Park^{***}, and Moon G. Joo^{**}

^{*}*Dept. Unmanned Vehicle System, Hanwha R&D Center, Daejeon, Korea,*

^{**}*Dept. Information and Communications Engineering, Pukyong Nat. Univ., Busan, Korea*

^{***}*Dept. Electronic Engineering, Pukyong Nat. Univ., Busan, Korea, {happy072, squallkor}@nate.com, {radar, gabi}@pknu.ac.kr*

Abstract

In this paper, we propose a design method of tracking and controlling AUV (autonomous underwater vehicle) with wide range of velocity. The controller consists of a fuzzy system and a few state feedback modules for nominal surge speeds. The state feedback controllers for determined surge speeds are designed by the pole placement technique in discrete time domain. The fuzzy controller is designed where the outputs of state feedback controllers are combined by the surge speed of AUV. As a result, the AUV control becomes stable even when the surge speed of AUV changes within the considered range of the state feedback modules. By simulation using Matlab/Simulink, the performance of the proposed controller is shown to be efficient for nominal way point tracking like as zigzag or '8' shaped trajectory.

Acknowledgement

This work is the result of the "Human Resource Development Center for Economic Region Leading Industry" Project, supported by the Ministry of Education, Science & Technology (MEST) and the National Research Foundation of Korea (NRF).