DYNAMIC LEVELING CONTROL OF A WIRELESS SELF-BALANCING ROV USING FUZZY LOGIC CONTROLLER

Mohammad, Afifi¹, Dirman, Hanafi², Ayob, Johari³
¹²Department of Mechatronics and Robotics Engineering, Universiti Tun Hussein Onn Malaysia, Parit Raja, Batu Pahat, Johor
³Department of Communication Engineering, Universiti Tun Hussein Onn Malaysia, Parit Raja, Batu Pahat, Johor
mohammadafifiayob@gmail.com, dirman@uthm.edu.my, ayob@uthm.edu.my

Abstract

A remotely operated vehicle (ROV) is essentially an underwater mobile robot that is controlled and powered by an operator outside of the robot working environment. Like any other marine vehicle, ROV has to be designed to float in the water where its mass is supported by the buoyancy forces due to the displacement of water by its hull. Vertically positioning a mini ROV in centimeters resolution underwater and maintaining that state requires a distinctive technique partly because of the pressure exerted by the water towards the hull and partly because of the random waves produced by the water itself. That being said, the aim of the project is to design and develop the fuzzy logic controller for a wireless self-balancing buoyancy system of a mini ROV. A liquid level sensor had been implemented to provide feedback to the controller. A user-friendly graphical user interface (GUI) had been developed for real-time data monitoring as well as controlling the vertical position of the ROV. At the end of the project, the implemented fuzzy control system shows enhanced and better performance when compared with one without a controller and a proportional-derivative (PD) controller.