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Design and Implementation of Control System in Underwater Glider of Ganeshblue

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Abstract : Autonomous Underwater Vehicle glider is one of the renewal of underwater vehicles. This vehicle is one of the autonomous underwater vehicles that are being developed in Indonesia. Glide ability is obtained by controlling the buoyancy and attitude of the vehicle using the movers within the vehicle. The glider motion mechanism is expected to provide energy resistance from autonomous underwater vehicles so as to increase the cruising range of rides while performing missions. The control system on the vehicle consists of three parts: controlling the attitude of the pitch, the buoyancy engine controller and the yaw controller. The buoyancy and pitch controls on the vehicle are sequentially referring to the finite state machine with pitch angle and depth of diving inputs to obtain a gliding cycle. While the yaw control is done through the rudder for the needs of the guide system. This research is focused on design and implementation of control system of Autonomous Underwater Vehicle glider based on PID anti-windup. The control system is implemented on an ARM TS-7250-V2 device along with a mathematical model of the vehicle in MATLAB using the hardware-in-the-loop simulation (HILS) method. The TS-7250-V2 is chosen because it complies industry standards, has high computing capability, minimal power consumption. The results show that the control system in HILS process can form glide cycle with depth and angle of operation as desired. In the implementation using half control and full control mode, from the experiment can be concluded in full control mode more precision when tracking the reference. While half control mode is considered more efficient in carrying out the mission.

Keywords : control system, PID, underwater glider, marine robotics
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