Motion Control Algorithm for Path Following and Trajectory Tracking for Unmanned Surface Vehicle: A Review Paper

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ABSTRACT

A capability of tracking and follows the target object on the water surface is an essential measurement in the control system for a Unmanned Surface Vehicle (USV). Path following algorithm usually used to describe the target, compute in the controller and minimize as well as to zero the distance between USV; and the angle between the vessel speed and the tangent to the path. USV needs to follow a time-parameterized reference curve are defined as a trajectory tracking. This paper gives an attention in reviewing a few common path following as well as path tracking techniques used in the design of USV where there is no predefined position will be declared in the control system. In particular, this paper is focused on a motion control approaches developed using USV by reviewing forty journals for last ten years. Based on the reviews, a line-of-sight (LOS) technique is a frequently implemented in the USV control system than another method such as constant-bearing guidance, Kalman filtering, PID guidance, Lyapunov-based guidance, pure-pursuit (PP) guidance, motion goal prediction, back stepping method and Jacobian task priority. As the conclusion, various types of mathematical computation are introduced in the USV control system is customizes with the requirement based on the situation needed will make this autonomous vehicle more advanced.

KEYWORDS: Unmanned Surface Vehicle (USV); motion control; path following; trajectory tracking

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