

Adaptive Fuzzy-PID Controller for Quad-rotor MAV with Mass Changes

Goh Ming Qian¹, Dwi Pebrianti^{1,3}, Luhur Bayuaji^{2,3}, Rosdiyana Samad¹,
Mahfuzah Mustafa¹ and Mohammad Syafrullah³

¹ Faculty of Electrical & Electronics Engineering, University Malaysia Pahang, Campus Pekan, 26600 Pekan, Pahang.

² Faculty of Computer Science and Software Engineering, University Malaysia Pahang, Malaysia.

³ Magister of Computer Science, University Budi Luhur, Indonesia.

gohmingqian@gmail.com / dwipebrianti@ump.edu.my

Abstract. Micro Aerial Vehicle (MAV) has become famous to be used in agricultural application such as for spraying operation, for watering plantation or spraying the pesticide, 2-D flow visualization image to measure the droplet distribution and so on. Due to the need to sustain food for all human population, there is need for development of effective spraying to increase the productivity. In crop spraying, the payload changes against time is the big challenge on the development of MAV. This is because the payload change problem could affect the altitude which is the position along z-axis of the MAV. In this research, a quad-rotor MAV is used as the platform. Then, an adaptive Fuzzy-PID controller for the altitude control by considering payload change is presented. The performance of altitude control by using adaptive Fuzzy-PID controller and PID controller are validated in this research study through simulation. The adaptive Fuzzy-PID controller is successfully designed for the changing of payload. The result shows the performance of adaptive Fuzzy-PID controller is better than PID controller on quad-rotor MAV control considering payload changes.

Keywords: Adaptive Fuzzy-PID controller, Quad-rotor MAV, Payload Change