Review of: "Neuro-Fuzzy-Based Adaptive Control for Autonomous Drone Flight"

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Potential competing interests: No potential competing interests to declare.

This paper aims to propose a Linear Quadratic Regulator-Adaptive Neuro-Fuzzy Inference System (LQR-ANFIS) controller, which is claimed to be novel by the authors, for stabilization of a drone flight. Although the authors have put great efforts in reporting their findings, the quality of this write-up is reluctant to be considered further for a journal publication. Comments for improvement from the reviewer are summarized as follows.

a. The authors need to further explore how to write a technical paper with logic and coherence. The abstract must be concise, informative, and precise to attract the readers, instead of showing unclear words like "an intelligent adaptive hybrid controller", "both", "representative", "preliminary", "promising", etc. An introduction section should basically contain the background and motivation of your research, followed by a comprehensive literature review of the topic, and then a summary of the deficiencies/incompleteness/limitations of the existing work, followed by a statement of the major contributions of your proposed work. The authors barely deliver the information in a logical way.

b. In the Method section, the authors have thrown a lengthy set of equations about the drone model itself to the main body of the report, whose details could have been put in the appendix. However, when it comes to LQR-ANFIS, which is supposed to be the main contribution of this work, almost no mathematical description is shown. This makes no sense to the readers. In addition, not all the parameters and variables in the equations are clearly and correctly defined. For example, what is your state variable "e" in your state vector? Is it supposed to be the yaw rate "r"? How do you define stability derivatives, control derivatives, and coefficients of roll movement, yaw movement and side force?

c. For the Experiment section, the review is confused with whether the authors really performed an experiment. It seems that all the results are simulation results from Simulink, correct? Also, can you describe what use cases you are simulating so that the readers may know what results to expect? Why does PID even suddenly shows up in the result section without any clue? By just comparing Fig. 12 and Fig. 13, are you confident in saying that your proposed controller beat all other "conventional controllers"? Is overshoot the only criterion for you to make the decision? How do you quantify them? Please show specific numbers. The authors may consider reorganizing the presentation of the results in order to deliver a convincing conclusion.

d. This work is more like a report than a technical paper, because unprofessional descriptions, equation format, and figure displays are seen everywhere. Please avoid using oral, imprecise, or inconclusive expressions such as:

"It is a well-known fact that UAVs have many stability problems, such as shaking, being out of control, and even crashing, if endowed with manipulators."

"if these attributes are not achieved, the UAV will not be certified to operate any task or operation."

"However, despite the environment, <u>they</u> operate a UAV and will face several uncertainties, …"

"In such a situation, <u>the better option would be to</u> follow the non-model or data-driven methodology."

"Numerical experimental results show that the proposed algorithm <u>is more efficient than</u> the traditional control algorithms. So, such an algorithm will ensure that <u>the whole</u> UAV system is <u>safe and reliable</u>."

"Moreover, this paper's contribution will lead to several benefits including an <u>enhanced and broadened understanding</u> of the <u>nature</u> and characteristics of adaptive and intelligent control systems, and a <u>better understanding</u> of UAV dynamics, to <u>give the researcher, students and industry the ability</u> to solve adaptive control problems.

"This work <u>lays</u> a foundation for this study by <u>looking into</u> the applications of <u>other researchers'</u> different control techniques."

"A <u>comparative and empirical analysis</u> <u>was done</u> during the experiments to demonstrate the effectiveness of hybrid controllers <u>vs</u> traditional controllers."

and so on so forth.

In summary, due to the above concerns, the reviewer cannot recommend this article for publications, unless they are all well-addressed by the authors.