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

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Potential competing interests: No potential competing interests to declare.

The paper "Neuro-Fuzzy-Based Adaptive Control for Autonomous Drone Flight" presents a novel approach using a Linear Quadratic Regulator-Adaptive Neuro-Fuzzy Inference System (LQR-ANFIS) hybrid controller for the stabilization of quadcopter drones. While the paper addresses an interesting and relevant topic, some areas could be improved and some potential flaws to consider for the possible publication in this journal:

1. **Mathematical Rigor and Clarity:**

- Ensure that all mathematical equations are well-defined and explained thoroughly. Provide detailed explanations for each term in the equations to enhance reader comprehension.

2. **Algorithmic Details:**

- Elaborate on the algorithmic steps of the proposed LQR-ANFIS hybrid controller. Provide a step-by-step breakdown of how the controller operates to give readers a clear understanding of the implementation.

3. **Extended Kalman Filter (EKF) Justification:**

- Provide a more in-depth justification for using the Extended Kalman Filter (EKF) in the methodology. Explain how EKF specifically addresses the nonlinearity of drone flight dynamics and why it is chosen over alternative filtering methods.

4. **Simulation Parameters and Assumptions:**

- Clearly state the simulation parameters, assumptions, and limitations. Discuss the rationale behind the chosen parameters and how well they represent real-world scenarios.

5. **Performance Metrics:**

- Introduce quantitative performance metrics to evaluate the effectiveness of the proposed controller. Metrics such as overshot, settling time, and disturbance rejection can provide a more objective assessment.

6. **Comparative Analysis:**

- Extend the comparative analysis between the proposed LQR-ANFIS controller and traditional controllers. Discuss how the hybrid controller outperforms or addresses limitations seen in conventional controllers.

7. **Control System Stability Analysis:**

- Perform a stability analysis of the proposed control system. Discuss the stability criteria and conditions under which the controller guarantees stable drone flight.

8. **Parameter Tuning Sensitivity Analysis:**

- Investigate the sensitivity of the proposed algorithm to variations in parameters. Discuss how changes in key parameters impact the performance of the LQR-ANFIS controller.

9. **Real-world Applicability Discussion:**

- In the conclusion or future work section, discuss potential challenges and considerations for implementing the proposed algorithm in real-world scenarios. Address factors such as sensor noise, hardware constraints, and external disturbances.

10. **Algorithm Robustness:**

- Evaluate the robustness of the LQR-ANFIS controller by introducing variations in the drone's dynamics or disturbances. Demonstrate how well the controller adapts to changes in the environment or system conditions.