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Leader–Follower Formation for UAV Robot Swarm Based on Fuzzy Logic Theory

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Abstract

This paper proposes an algorithm based on a fuzzy logic approach, capable to guide a robot swarm with the aim to keep a leader–follower formation without colliding with other swarm agents. The

fuzzy system is programmed and evaluated originally in Matlab, where several experiments were performed. The results depicted a robot swarm showing some bio-inspired behaviors, such as swarm agents surrounding the leader when it is in a static position or when it is traveling from one place to another place. Finally, the proposed fuzzy system was implemented on a drone swarm using V-Rep. The drones simulation shows the swarm navigating together and keeping the leader in the center of the swarm when it is static and following the leader when it is moving. These results could be evaluated in a future work using drone robot swarm in real environments.

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