A novel leader-following strategy based on fuzzy logic is introduced to design a formation flight controller for unmanned quadrotors. The proposed strategy uses particle swarm optimization (PSO) to optimize the fuzzy membership function in the guidance law, and a nonlinear dynamic inversion (NDI) controller is designed to control the nonlinear dynamics of the quadrotor. The simulation results show the proposed method has significant advantages in comparison with conventional leading-following strategies in terms of robustness against wind gusts, uncertainties, and unknown dynamics.

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Index Terms
Keywords

Nonlinear control, Intelligent systems, UAV, Optimization.