عنوان مقاله:

(Controlling a Micro Quadrotor Using Nonlinear Techniques Tuned by Firefly Algorithm (FA

محل انتشار:

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خلاصه مقاله:

Although micro quadrotors have been known to be highly unstable systems, several attempts have been made to stabilize such systems. Sliding mode and backstepping are two powerful nonlinear design tools used to stabilize nonlinear unstable systems and make them robust against uncertainties. In the sliding mode control, trajectories should reach a sliding manifold in finite timeand remain on the manifold for all future time. Backstepping is a recursive procedure that breaks adesign problem into smaller design problems, thus making it possible to solve stabilization,tracking, and robust control problems. In this paper, the case of a nonlinear unstable system, namely a micro quadrotor, was studied, and two design tools were employed to obtain desiredtrajectory tracking. Firefly optimization algorithm was applied to the problem to determine the optimal sliding mode and backstepping parameters. This paper presents a comprehensive performance comparison of the micro quadrotor under two design tools. Results indicate that bothbackstepping and sliding mode design tools are successful in stabilizing the system to follow the desired path.

کلمات کلیدی:

Firefly algorithm, Backstepping, Sliding mode, Micro quadrotor