

عنوان مقاله:

Supervisory adaptive interval type- γ fuzzy sliding mode control for planar cable-driven parallel robots using Grasshopper optimization

محل انتشار:

مجله سیستم های فازی, دوره 19, شماره 5 (سال: 1401)

تعداد صفحات اصل مقاله: 19

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خلاصه مقاله:

Design of an adaptive supervisory fuzzy sliding mode control for a planar cable-driven parallel robot is aided in this paper. The fuzzy logic controller is proposed to generate the switching control signal without occurring the chattering problem. For this purpose, an adaptive mechanism is suggested for online tuning of the output gain of the fuzzy sliding mode controller. Moreover, for better tracking, a supervisory control system is considered for online tuning of the PID sliding surface gains. The Grasshopper Optimization Algorithm is suggested for optimization of the membership functions selected for the fuzzy sliding surface. The stability proof of the closed-loop system is derived by using the Lyapunov stability theorem. Simulation results are reported to show the merits of the proposed controller on reduced chatter, and system robustness against parameter uncertainty, load disturbance, and nonlinearities.

کلمات کلیدی:

Cable-driven parallel robot, internal force, Sliding Mode, interval type- γ fuzzy system, Adaptive, supervisory control, Chattering, the grasshopper optimization algorithm

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