

International Journal of Fuzzy Systems: Special Issue

Fuzzy Control Systems: Analysis, Design and Applications

As an efficacious and susceptible synthesis scheme in the intelligent control area, fuzzy control strategy has achieved considerable progress in both theory and in technology domain over the past two decades. At the same time, a great amount of realistic applications of fuzzy control have been pervaded in household appliances (fuzzy washing machine, air conditioning, microwave ovens, vacuum cleaners, camera and camcorder, etc.), modern industrial process (water purification treatment, fermentation, chemical reactors, cement kiln, etc.), and also includes special systems and other aspects (subway parking system, vehicle driving, elevator, escalator, steam engines and robot, etc.). The fuzzy control system is actually one kind of the approximation of nonlinear systems, which has basically formed some systematic but not unified theory (Mamdani fuzzy logic system, type-1 and type-2 fuzzy sets based Takagi–Sugeno (T–S) fuzzy systems, up to now). Fuzzy control systems indeed possess a more appropriate characteristic in simplifying the complexity of system design, and especially suiting for the nonlinear, time-varying and model of incomplete systems. Besides, the corresponding fuzzy controller has the virtue of better flexibility and robustness, and fault tolerance. Now and in the future, fuzzy control systems are developing towards adaptive control, self-learning and self-organization, which allow the automatic adjustment, modification and improvement of the fuzzy control parameters and rules during the operation process. Thus, the more improved performance of the fuzzy control systems can be achieved and the better intelligence of whose applications can be ended.

The objective of this special issue is to explore latest up-to-date modeling, analysis, decoupling and synthesis approaches to fuzzy control systems and their applications. Both theoretical and application results are sought for. It offers a concentrative venue for researchers to make rapid exchange of ideas and original research findings in fuzzy control systems and their applications. In particular, new interdisciplinary approaches in fuzzy control theory and engineering applications, or strong conceptual foundation in newly evolving topics are especially welcome. We invite researchers and experts worldwide to submit high-quality original research papers and critical survey articles on the following potential topics and their applications, but are not limited to:

- ★ Mathematical modeling of complex fuzzy control systems
- ★ Stability and performance analysis of fuzzy control systems
- ★ Optimization of fuzzy control systems
- ★ Advanced control techniques for fuzzy control systems
- ★ Simulation tools for fuzzy-system-based control
- ★ Applications of mathematical theories to industrial and manufacturing processes/systems
- ★ Fuzzy-PID composite control
- ★ Adaptive fuzzy control
- ★ Parameter self-tuning fuzzy control
- ★ Fuzzy control of the human simulated intelligent
- ★ Neuro-fuzzy control
- ★ Applications related to the above topics

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