

SS26: Theoretical Applications of Fuzzy Logic

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The fuzzy logic control system is very useful in many industrial applications. In this session we will have a chance to understand a stability analysis of fuzzy logic system with an interval time varying delay, a chaotic behavior in love affairs of fractional order with fuzzy membership function as an external force and an application of multi-agent control systems in energy-efficient intelligent building.

In the paper of a stability analysis of fuzzy logic system, authors propose a new and improved stability condition for Takagi-Sugeno (T-S) fuzzy systems subject to interval time varying delay. The stability analysis is carried out by constructing a new Lyapunov-Krasovskii (L-K) functional along with the use of tighter bounding integral inequality to approximate the integral term coming out from the derivative of L-K functional. Two numerical examples are included to show the effectiveness of the proposed theoretical results over some existing approaches.

The paper of a chaotic behavior in love affairs considers love affairs of fractional-order system with external force. In this paper, authors use fractional order differential equation that can be represented by Romeo and Juliet's love affairs to make chaotic behavior in the proposed fractional love model.

We will also see an application of multi-agent control systems in energy-efficient intelligent building from the last paper. Authors here propose that a temperature control, humidity, lighting and CO₂ levels must be controlled for a maximum comfort in the building.

These papers are all related to fuzzy logic or intelligent systems and they will contribute a successful Joint 17th World Congress of International Fuzzy Systems Association and 9th International Conference on Soft Computing and Intelligent Systems.