

SC42050 Literature Assignment

Takagi-Sugeno descriptor systems

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Description

This assignment concerns the descriptor formalism of TS systems as described in (Marx et al., 2007).

Questions

1. Describe briefly the descriptor formalism (see also references [13-15] in the paper).
2. Compare this formalism to the classical form of TS systems (see (Tanaka et al., 1998)). What are the advantages and shortcomings of descriptor systems?
3. The example in the paper is a numerical one. Think about a real-world application which would benefit from the descriptor form for observer/controller design, and sketch your implementation.

References

- Marx, B., Koenig, D., and Ragot, J. (2007). Design of observers for Takagi–Sugeno descriptor systems with unknown inputs and application to fault diagnosis. *IET Control Theory & Applications*, 1(5):1487–1495.
- Tanaka, K., Ikeda, T., and Wang, H. O. (1998). Fuzzy regulators and fuzzy observers: relaxed stability conditions and LMI-based designs. *IEEE Transactions on Fuzzy Systems*, 6(2):250–265.