Robust estimation for uncertain stochastic fuzzy T-S models with state-dependent noises

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Abstract

In this study, state estimation problem for the stochastic T-S fuzzy model with state-dependent noises on the
system matrix and the output matrix is attacked. First, we derive
sufficient conditions for a class of standard fuzzy
state observers to ensure that the state estimation error is mean square
bounded. The observer gain matrices in the
fuzzy observer can be obtained by solving a set of linear matrix
inequalities (LMI). Then, the robust H∞ fuzzy
filtering problem is considered to minimize the worst-case ratio of the
power of state estimation error to that of
external noises. The H∞ fuzzy observer gain matrices can be obtained by
solving two sets of linear matrix
inequalities. Evaluation of estimation performance of the robust H∞ fuzzy
filter is made via simulation study.

Keyword：Stochastic T-S fuzzy model, State estimation, H∞ fuzzy
filtering, State-dependent noise