Optimal H-2 and H-infinity mode-independent filters for generalised Bernoulli jump systems

Resumo

This paper provides the optimal solution of the filtering design problem for a special class of discrete-time Markov jump linear systems whose transition probability matrix has identical rows. In the two-mode case, this is equivalent to saying that the random variable has a Bernoulli distribution. For that class of dynamic systems we design, with the help of new necessary and sufficient linear matrix inequality conditions, {[}GRAPHICS] and {[}GRAPHICS] optimal mode-independent filters with the same order of the plant. As a first proposal available in the literature, for partial information characterised by cluster availability of the mode, we also show it is possible to design optimal full-order linear filters. If some plant matrices do not vary within the same cluster, we show that the optimal filter exhibits the internal model structure. We complete the results with illustrative examples. A realistic practical application considering sensors connected to a network using a communication protocol such as the Token Ring is included in order to put in evidence the usefulness of the theoretical results. (AU)

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