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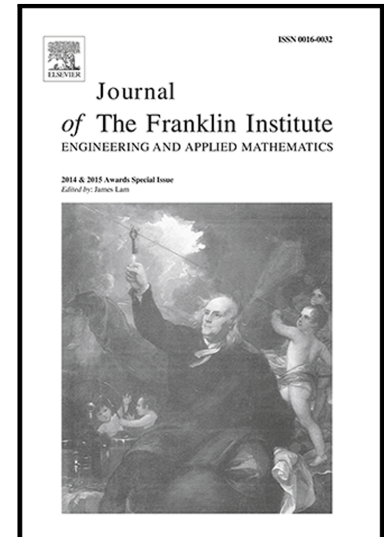
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State and unknown input estimation for a class of infinitely unobservable descriptor systems using two observers in cascade

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Abstract

This paper presents an observer scheme for state and unknown input estimation for a class of infinitely unobservable descriptor systems. Though there are observer schemes for infinitely unobservable systems, they may require a higher number of outputs, which could prove restrictive. The proposed scheme in this paper consists of two observers - the first one being a standard linear observer for descriptor systems. Signals from that observer are processed and found to be the output of an analytical regular state-space system. Then, the second observer, which is a sliding mode observer, is applied to estimate the state and unknown input. Necessary and sufficient conditions associated with the scheme are also derived. Finally, a simulation example is presented to demonstrate the effectiveness of the scheme.

Keywords:

Linear systems, observers, state estimation, descriptor systems, sliding-mode observers

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