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Asynchronous Sequential Machines with Fault Detectors

Authors : Seong Woo Kwak, Jung-Min Yang

Abstract : A strategy of fault diagnosis and tolerance for asynchronous sequential machines is discussed in this paper. With no synchronizing clock, it is difficult to diagnose an occurrence of permanent or stuck-in faults in the operation of asynchronous machines. In this paper, we present a fault detector comprised of a timer and a set of static functions to determine the occurrence of faults. In order to realize immediate fault tolerance, corrective control theory is applied to designing a dynamic feedback controller. Existence conditions for an appropriate controller and its construction algorithm are presented in terms of reachability of the machine and the feature of fault occurrences.

Keywords : asynchronous sequential machines, corrective control, fault diagnosis and tolerance, fault detector
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