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Act-and-Wait Control Theory for Continuous-Time Systems with Random Feedback Delays

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Abstract: Continuous-time systems with random state feedback delay are difficult to control in general because of its infinite poles. In this paper, the act-and-wait controller is well developed to solve this problem. If the infinite dimensional pole placement problem can be reduced to a finite dimensional one, it would be facility to make the system stable by the aid of pole placement method. The mechanism of the act-and-wait concept is that the state feedback is periodically switched on (act) and off (wait) during the control procedure. By using the act and wait controller, the stability of system can be represented by a finial dimensional monodromy matrix when the interval between two successive act moments is larger than the maximum state feedback delay. The aim of this paper is to design the periodic controller so that a finite number of eigenvalues can describe stability of the delay system, so the stability of the system can be achieved by use of pole placement method. The efficiency of the method is shown by a simulation.

Keywords: *act-and-wait controller; random delay; pole placement; stability.*

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