Abstract

In this paper, the chaos synchronization problem is treated by an unknown input proportional integral observer (PIO) for a Takagi-Sugeno (TS) fuzzy chaotic model subject to unknown input and unmeasurable decision variables. This unknown input is considered like a message to encode by a chaotic system then to decode or to reconstruct by the PIO after to be transmitted by a public transmission canal in order to a secure communication system. In our case, the unknown input affects both state and output of the chaotic system. The synthesis conditions of this PIO are based on the hypothesis that the unknown input is under polynomial form with its kth derivative zero. At the end the measurable decision variables are also considered in this work like a particular case. The Lyapunov theory is used to develop the stability conditions of the unknown input PIO in LMIs formulation. A simulation example is proposed through a TS fuzzy chaotic model to validate the proposed design