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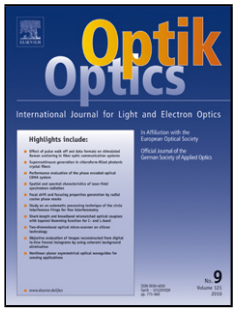

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Author: Junwei Lei Lingling Wang

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Backstepping synchronous control of chaotic system with reduced number of active inputs

Junwei Lei, Lingling Wang

[1]*Department of Control Engineering, Naval Aeronautical and Astronautical University , Yantai, 264001,China*

Abstract:

Synchronization of chaotic systems is very useful in secure communication. A kind of reduced number of active input method was proposed to achieve the synchronization of Genesio system and Chen system, which will not only make its application in communication more safe and more difficult to be deciphered, but also it can make the synchronization device more economical. And to make the proposed method can be applied in a more general situation of synchronization of chaotic systems , a special second order system control problem with double control coefficients was researched first. it It is very difficult and complex to compute the accurate value of the derivative of expect state of the second order system, which is caused by the double control directions. A kind of simple backstepping method is proposed to neglect the derivative of expect state. So the derivative of control will not appear and the design process of second order mini-phase system will be largely simplified. And also the stability of the system is proved by constructing a Lyapunov function. At last, detailed simulation is done to testify the rightness of proposed method.

Keywords *: sliding mode control; robustness; synchronization; chaotic system; backstepping*

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