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Synchronization and antisynchronization protocol design of chaotic nonlinear gyros: an adaptive integral sliding mode approach

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Abstract

A novel control protocol design, via integral sliding mode control with parameter update laws, for synchronization and desynchronization of a chaotic nonlinear gyro with unknown parameters is the focus of this work. The error dynamics of the actual system are substructured into nominal and uncertain parts to employ adaptive integral sliding mode (AISM) control. The uncertain parameters are estimated via devised adaptive laws. Then the disagreement dynamics are guided to origin via AISM control. The stabilizing controller is also designed in terms of nominal control along with a compensating component. The control and the parameter update laws are constructed to ensure the strictly negative derivative of a Lyapunov function. Graphical results related to synchronization, desynchronization, and chaos suppression are displayed to demonstrate the potential of the proposed control.

Keywords

Author Keywords: [Chaotic gyro](#); [synchronization](#); [desynchronization](#); [adaptive backstepping method](#); [AISM control](#); [Lyapunov function](#)

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