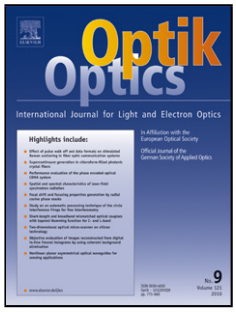

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Simpler ZD-achieving controller for chaotic systems synchronization with parameter perturbation, model uncertainty and external disturbance as compared with other controllers

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Abstract

The synchronization of chaotic systems has been studied recently due to its fundamental role in engineering fields. However, many conventional synchronization controllers are designed without considering the parameter perturbation, model uncertainty or external disturbance and the design processes of most conventional controllers are relatively quite complicated. Motivated by the above considerations and inspired by the zeroing dynamics (ZD) method, a quite simple and effective ZD-achieving controller is designed for the synchronization of chaotic systems with the simultaneous existence of parameter perturbation, model uncertainty and external disturbance. Theoretical analysis and numerical simulations show the strong robustness of the ZD-achieving controller, and show that the precision can be enhanced by adjusting the value of the parameter in the controller. Moreover, a modified ZD-achieving controller is designed to further improve the ZD-achieving controller. Besides, for comparison, the conventional ZD-derived controller and the linear active controller are presented. Finally, both the synchronization of two isomorphic chaos systems and the synchronization of two heteroideous chaos systems are investigated to substantiate the effectiveness and superi-

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