



Synchronization of time delay systems with non-diagonal complex scaling functions

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Abstract:

This paper deals with a kind of synchronization of dynamical systems with complex variables which is called generalized complex modified hybrid function projective synchronization (GCMHFPS) of time delay complex chaotic (hyperchaotic) systems. In other words, that the time delay complex systems can be synchronized up to a complex function transformation matrix. Moreover, the elements of the transformation matrix are complex functions of the states of drive system and time, where this matrix is not square. The idea of an active control method based on complex Krasovskii-Lyapunov functional is used to achieve GCMHFPS of time delay complex systems. Furthermore, based on the non-diagonal complex function transformation matrix, the modules and phases errors between one state of the complex response system and more than one of the states of the drive system are studied which have not been discussed before as far as we know. The analytical expression regarding the stability of this technique is derived and excellent agreement is found upon comparison with numerical calculations. In particular, we show through studying the time evolution of error, modulus and phase that the proposed scheme is effective for controlling time delay complex systems.

Keywords:

Time delay Complex synchronization Krasovskii-Lyapunov Phase Modulu

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