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Chaos Analysis of a 3D Finance System and Generalized Synchronization for N-Dimension

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Abstract : The article in hand is the study of complex features like Zero Hopf Bifurcation, Chaos and Synchronization of integer and fractional order version of a new 3D finance system. Trusted tools of averaging theory and active control method are utilized for investigation of Zero Hopf bifurcation and synchronization for both versions respectively. Inventiveness of the paper is to find the answer of a question that is it possible to find a chaotic system which can be synchronized with any other of the same dimension? Based on different examples we categorically develop a theory that if a couple of master and slave chaotic dynamical system is synchronized by selecting a suitable gain matrix with special conditions then the master system is synchronized with any chaotic dynamical system of the same dimension. With the help of this study we developed generalized theorems for synchronization of n-dimension dynamical systems for integer as well as fractional versions. it proposed that this investigation will contribute a lot to control dynamical systems and only a suitable gain matrix with special conditions is enough to synchronize the system under consideration with any other chaotic system of the same dimension. Chaotic properties of fractional version of the new finance system are also analyzed at fractional order q=0.87. Simulations results, where required, also provided for authenticity of analytical study.

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