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SYNCHRONIZATION OF CHAOS IN AN INCOMMENSURATE FRACTIONAL-ORDER COMPUTER VIRUS SYSTEM

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ABSTRACT

This study explores the synchronization of a discrete computer virus model governed by incommensurate fractional-order dynamics. Utilizing fractional calculus, the model effectively reflects memory-dependent and non-local characteristics commonly observed in real-world virus transmission. We examine the system's dynamic behavior, stability conditions, and control strategies. Through comprehensive analytical techniques and supporting numerical simulations, synchronization conditions are established, and the influence of incommensurate fractional orders on the system's evolution is assessed. The results enhance the theoretical understanding of fractional-order systems and offer practical insights for designing robust approaches to control the spread of computer viruses in complex network environments.

***K*eywords** Computer virus model · Synchronization · Incommensurate fractional order · Numerical simulations

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