Synchronization of Time-Delay Chua's Oscillator with Application to Secure Communication

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Abstract: In this paper, we use a Generalized Hamiltonian systems approach to synchronize the time-delay-feedback Chua's oscillator (hyperchaotic circuit with multiple positive Lyapunov exponents). Synchronization is thus between the transmitter and the receiver dynamics with the receiver being given by an observer. We apply this approach to transmit private analog and binary information signals in which the quality of the recovered signal is higher than in traditional observer techniques while the encoding remains potentially secure.