Time-Delayed Feedback Control Design Beyond the Odd-Number Limitation

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Abstract: We present an algorithm for a time-delayed feedback control design to stabilize periodic orbits with an odd number of positive Floquet exponents in autonomous systems. Due to the so-called odd-number theorem such orbits have been considered as uncontrollable by time-delayed feedback methods. However, this theorem has been refuted by a counterexample and recently a corrected version of the theorem has been proved. In our algorithm, the control matrix is designed using a relationship between Floquet multipliers of the systems controlled by time-delayed and proportional feedback. The efficacy of the algorithm is demonstrated with the Lorenz and Chua systems.