

## PASSIVITY-BASED CONTROL OF CHAOTIC LÜ SYSTEM

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**ABSTRACT.** *Control chaos of the Lü system was discussed by using the passive control theory, with the study of the property of passive system, the essential conditions under which the Lü system could be equivalent to a passive system via smooth state feedback were derived. It was found that the new system transformed by the Lü chaotic system, could be globally asymptotically stabilized at different equilibrium points, provided that suitable controllability-like rank conditions were satisfied. Simulation results indicated that the proposed chaos control method is very effective in Lü chaotic system.*

**Keywords:** Nonlinear control, Lü chaotic system, Passivity theory, Equilibrium points

1. **Introduction.** The term control of chaos is used mostly to denote the area of studies lying at the interfaces between the control theory and the theory of dynamic systems studying the methods of control of deterministic systems with nonregular, chaotic behavior [1-3]. Recently, how to apply chaos has become the researching focus. Chaos control and anti-control is the basic problem of the application of chaos. In the early nineties, American physicists proposed a control method using inherent chaotic characters. Afterwards, some scholars developed this control method and proved its validity with many experiments, which resulted in an upsurge in chaotic control and its applications [2-8].

However, these chaotic control methods were proposed with no regard to the inherent characters of chaotic dynamical systems.

The passive systems are one of the network theory concepts, which show a kind of characteristics of dissipative network [9-11]. Using the passive network theory, chaotic dynamical system characters, such as stabilization, dynamic characteristics, can be analyzed. In this paper, based on passive networks theory, mainly research on the Lü chaotic