

## The Uniting Control Lyapunov Functions in Permanent Magnet Synchronous Linear Motor

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**Abstract :** This study investigates the permanent magnet synchronous linear motor (PMSLM) chaotic motion under the specific physical parameters, the stability and the security of motor-driven system will be unavoidably influenced. Therefore, it is really necessary to investigate the methods of controlling or suppressing chaos in PMSLM. Firstly, we derive a chaotic model of PMSLM in the closed-loop system. Secondly, in order to realize the local asymptotic stabilization of the mechanical subsystem and the global stabilization of the motor-driven system including electrical subsystem, we propose an improved uniting control lyapunov functions by introducing backstepping approach. Finally, an illustrated example is also given to show the electiveness of the obtained results.

**Keywords :** linear motor, lyapunov functions, chao control, hybrid controller

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