3D Controllable Set of Linear Time-Invariant Open-Loop Unstable Systems with Constrained Input - A Submarine Case

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Abstract

This paper analyzes the controllable set (stability region) of a linear time-invariant open-loop unstable system with constrained input. In particular, we apply the Lyapunov descent criterion and Kuhn-Tucker Theorem to the case when the input is allowed to saturate. We demonstrate our approach by a real submarine case, and find the 3D controllable set for the case.

Keyword：3D controllable set, Lyapunov descent criterion, Constrained input