

Nonlinear Control of Mobile Inverted Pendulum: Theory and Experiment

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Abstract : This paper presents the design and implementation of a nonlinear controller for the point to point control of a mobile inverted pendulum (MIP). The controller is designed based on the kinematic model of the MIP to stabilize all the four coordinates. The stability of the closed-loop system is proved using Lyapunov stability theory. The proposed controller is validated through numerical simulations and also implemented in a laboratory prototype. The results are presented to evaluate the performance of the proposed closed loop system.

Keywords : mobile inverted pendulum, switched control, nonlinear systems, lyapunov stability

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