

Adaptive conditional integrators sliding mode control scheme for a class of nonlinear systems

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Abstract: The present paper is dedicated to the presentation and implementation of conditional integrators sliding mode controllers based on adaptive approach in order to synthesise tracking errors and to ensure Lyapunov stability, of all system nonlinearities and desired tracking trajectories. The adaptive approach allows an on-line estimation of nonlinear system parameters to use them in conditional integrator sliding mode control scheme. Indeed the proposed control law needs the exact system model to give good performances. The complexity of the nonlinear systems makes it hard to know its parameters. However, the integrator of sliding mode controllers is introduced in such a way that it provides integral action only (conditionally), effectively eliminating the performance degradation.

Finally, the proposed controller design is illustrated by application to control single inverted pendulum with simulation in MATLAB environment.

Keywords: Nonlinear system, Sliding mode, Adaptive approche, Stability, Conditionnal integrators, Invert pundulum.

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