

ADAPTIVE TRACKING CONTROL BASED ON DISTURBANCE ATTENUATION AND ISS STABILIZATION OF EULER LAGRANGE NONLINEAR SYSTEMS IN THE PRESENCE OF UNCERTAINTY AND INPUT NOISE

Chi Nguyen Van, Phuoc Nguyen Doan

TÓM TẮT:

Tracking control is an importance problem in applications of mechatronics systems described by Euler-Lagrange (EL). The adaptive tracking controllers introduced in are only used in case of no disturbance, such methods are mainly based on the principle of sliding mode control, however they cause chattering phenomenon. In this paper, we introduce a new adaptive tracking control method based on disturbance attenuation and ISS (Input to State Stable) stabilization of EL nonlinear systems in the presence of uncertainty and input noise. The main idea of this method is based on uncertain parameters adaptive compensation and disturbance attenuation ISS technique. The advantage of this method is tracking errors smoothly converge to the arbitrarily sufficient small neighborhood of the origin though the choosing designed controller parameters. The proposed control method removes chattering phenomenon, also remove all the Dawson's approximately estimate conditions and still achieve the desired tracking quality. Results are applied to the problem of stability tracking control for robot manipulator in the presence of torque noise, unknown mass of the end-effector.