

# Feedback stabilization of the systems with delays \*

Gen Qi Xu

Department of Mathematics, Tianjin University, Tianjin, 300072, China

January 30, 2015

## Abstract

In this talk, we introduce the our research development on the feedback stabilization problem of linear dynamic systems with interior delay, input delay and output delay. Firstly we study the hyperbolic system with interior delay and prove that if the dynamic system without delay is exactly controllable, then the state feedback control law is robust for the interior delay.

Secondly we investigate the system with distributed delays. Based on the partial state predictor we structure a dynamic feedback control law to stabilize exponentially the system.

Finally we study the stabilization problem of the system with output-delay. By employing the Lenberger observer, we design the feedback control law to stabilize exponentially the system.

**Key Words:** delay system; feedback control; hyperbolic system; exponential stabilization

**AMS subject classification.** 93D15, 93D20, 93B52, 93B60

---

\*This research is supported by the Natural Science Foundation of China grant NSFC-61174080