

# 学术报告会

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## On the Design of High Gain Observers for Semi-Global Stabilization of Nonlinear Systems

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### Abstract:

A globally asymptotically stable nonlinear system cascaded by a linear system through its output has been shown to be semi-globally asymptotically stabilizable by low-and-high gain feedback of the state of the linear system if the linear system is stabilizable and right invertible and with all its invariant zeros located in the closed left-half plane. Such low-and-high state feedback can be implemented by an observer. To retain a domain of attraction arbitrarily close to the domain of attraction under a given state feedback, high gain observer is employed to achieve arbitrarily fast decay of the observation errors of all states and the effect of the peaking phenomenon associated with the high observer gain is overcome by saturating the control input outside a region that contains the desired domain of attraction. In this talk, we present a co-design of the linear low-and-high gain state feedback and the high gain observer for semi-global stabilization of such a cascaded system without resorting to saturating the control input. Moreover, our design does not rely on making all state observation errors decay to zero arbitrarily fast.

### Biography:

林宗利教授是美国弗吉尼亚大学电机与计算机工程系终身教授，IEEE、IFAC、AAAS 和 CCA Fellow。林教授 1983 年于厦门大学获得数学与计算机科学学士学位，1989 年于中国空间技术研究院获得自动控制专业硕士学位，1994 年于美国华盛顿大学获得电气与计算机工程博士学位。目前的研究兴趣包括非线性控制、鲁棒控制、时滞系统和控制应用。林教授曾是 IEEE 控制系统协会理事会成员（2008-2010、2019-2021），IEEE 控制系统协会非线性系统与控制技术委员会主席（2013-2015）；曾在多个会议的运营委员会中任职，并将担任 2028 年美国控制会议的总主席。林教授目前是多家期刊的编辑委员会成员，并担任书籍系列 Birkhauser 的编辑。