Texas Tech University. Applied Mathematics Seminar.

ZERO DYNAMICS INVERSE DESIGN FOR BOUNDARY CONTROL SYSTEMS

David S. Gilliam, Texas Tech University

Wednesday, November 11, 2009

Room: MA 016, Time: 4:00pm

ABSTRACT. For many years asymptotic regulation has been an important design objective for both lumped and distributed parameter systems and an impressive variety of technical approaches have been used in the design of control laws for solving a wide variety of tracking and disturbance rejection problems. In this talk, we describe a new approach, which we call 'the zero dynamics inverse (ZDI) method', which can be used for designing a feedback compensation scheme achieving asymptotic regulation, i.e., asymptotic tracking and/or disturbance rejection, for many systems governed by boundary controlled linear or nonlinear distributed parameter systems. We will also discuss the relationship between the ZDI method and control laws obtained by solving the regulator equations from the well known geometric regulator theory as developed by C.I. Byrnes and A. Isidori for lumped nonlinear systems and recently extended to nonlinear distributed parameter systems by D.S. Gilliam and C.I. Byrnes. Some examples will be given for boundary control systems governed by (nonlinear) parabolic and hyperbolic PDEs in one and two spatial dimensions.