

**BELS (Bath-Exeter-London-Southampton)**  
**Control Seminar Series**

Room 1W3.6, Department of Mathematical Sciences, University of Bath  
Wednesday, 24 September 2008

**12:15 Optimal control of nonlinear systems with pathwise state constraints**

Piericola Bettiol, Imperial College, London

**Summary** The talk will review the field of optimality conditions for optimal control problems with state state constraints. It will describe the challenges of extending the classical Pontryagin Maximum Principle to allow for state constraints and the ‘nonsmooth’ calculus techniques that have been developed to overcome them. It will also cover the emerging literature on state constrained optimal control, concerning conditions for normality (i.e. conditions under which the Maximum Principle yields nontrivial information about minimizers) and on ‘sensitivity relations’ (interpretations of co-state arcs in terms of gradients of the cost-to-go function).

**13:15 Lunch**

**14:15 Infinite-dimensional feedback systems: the circle criterion and input-to-state stability**

Hartmut Logemann, University of Bath

**Summary** An input-to-state stability theory, which subsumes results of circle criterion type, is developed in the context of a class of infinite-dimensional systems. The generic system is of Lur’e type: a feedback interconnection of a well-posed infinite-dimensional linear system and a nonlinearity. The class of nonlinearities is subject to a (generalized) sector condition and contains, as particular subclasses, both static nonlinearities and hysteresis operators of Preisach type.

**15:15 Completing to an isomorphism in a Wiener algebra used in control theory**

Amol Sasane, London School of Economics

**Summary** We will address the question of whether a left invertible matrix with entries in a certain Banach algebra  $A$  can be completed to an invertible matrix with entries in  $A$ . The Banach algebra  $A$  we consider arises naturally in control theory as a class of stable transfer functions, and the relevance of the problem of completion to an isomorphism in control theory will also be explained.