



DEPARTMENT OF APPLIED MATHEMATICS APPLIED SEMINAR SERIES 2007

The Seminar Series of the Department of Applied Mathematics, UNSW, Sydney is dedicated to the announcement, dissemination and discussion of research in mathematics and its applications. A fundamental aim of the Seminar Series is to feature lectures that inform in a manner that makes the subject accessible to the audience, including non-specialists.

SPEAKER: Dr Roman Hilscher, Department of Mathematics and Statistics, Masaryk University, Czech Republic.

TITLE: Generalized inverses and linear Hamiltonian systems.

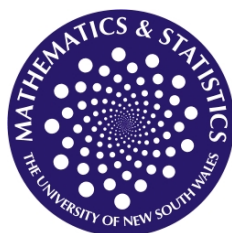
Abstract: In this talk we will discuss noninvertible matrix solutions of certain linear differential and discrete systems (called Hamiltonian and symplectic systems), which play an important role in second order optimality conditions for nonlinear calculus of variations and optimal control problems.

We will review the definition and properties of the Moore–Penrose generalized inverse so that no previous experience in this direction is needed.

The invertibility of the special matrix solutions of these systems can be translated in terms of the controllability or equivalently normality of the system, which is needed in the traditional second order optimality conditions in terms of the second variation. In this talk we will show that noninvertible matrix solutions arise naturally when the assumption of normality is eliminated. This idea comes from the study of discrete Hamiltonian and symplectic systems which, being defined on a finite discrete set, are naturally abnormal.

Time permitting, we will show at the end of the talk that the continuous time linear Hamiltonian systems and discrete symplectic systems can be unified and extended into the theory of time scale symplectic systems.

TIME AND VENUE: 3pm, Tues 13 November 2007, Room 3084, Red Centre.



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