ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

Invitation to a Guest Lecture

Robert Skiba

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“An Index Theorem in Relative K-Theory for Families of Differential Systems”

N.1.43 | Tuesday, 23 June 2026 | 3:00 p.m.

Abstract

In this talk, we will discuss an index theorem in relative K-theory for families of first-order differential systems on the real line. The motivation comes from the study of bifurcation of homoclinic orbits in dynamical systems. We will introduce the associated family of Fredholm operators and explain how its index can be described in the relative K-theory group $(KO(\Lambda, \Lambda_0))$. A central point of the talk will be the use of exponential dichotomies, which provide a more general framework than asymptotic hyperbolicity. We will also discuss the role of compact parameter spaces and explain how stable and unstable spaces form vector bundles over them. The main result expresses the index of the Fredholm family in terms of these stable and unstable bundles. Finally, we will indicate how a non-trivial index can be used to detect bifurcation points of homoclinic solutions. The talk presents results obtained in collaboration with Nils Waterstraat and Daniel Strzelecki.

Christian Pötzsche and the Department of Mathematics look forward to seeing you at the talk!