Karlsruhe Institute of Technology

Seminar of the Work Group
Nonlinear Partial Differential Equations
WS 22/23

Speaker: Wilhelm Treschow
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Seminar room: SR0.019

Embedded eigenvalues for asymptotically periodic ODE systems

Lund University

Abstract

I will discuss persistance of embedded eigenvalues of a certain Schrödinger-type differential operator under perturbations of an asymptotically periodic potential. The studied perturbations are small and belong to a certain Banach space with a specified decay rate, in particular, a weighted space of continuous matrix valued functions. The set of perturbations for which the embedded eigenvalue persists is shown to form a smooth manifold with a specified co-dimension. This is done using tools from Floquet theory, basic Banach space calculus, exponential dichotomies and their roughness properties, and Lyapunov-Schmidt reduction.

In the end, as a way of showing that the investigated setting exists, a concrete example is presented. The example itself relates to a problem from quantum mechanics and represents a system of electrons in an infinite one-dimensional crystal.