universität wien

FAKULTÄT FÜR MATHEMATIK
Dekan Univ.-Prof. Dr. Radu Ioan Bot

Einladung zur öffentlichen Defensio

Jakob Reiffenstein

Thema der Dissertation

Eigenvalue density of canonical systems

Abstract:

The overarching theme of my presentation is the quantitative description of the spectrum of two-dimensional canonical systems of differential equations. My fundamental results are two-sided estimates for the values along the imaginary axis of the go-to functions encoding the spectrum – the imaginary part of the Weyl coefficient (in limit point case) and entries of the monodromy matrix (in limit circle case). In each case, the lower and upper estimates coincide up to a universal multiplicative constant and are explicit in terms of the entries of the Hamiltonian. These results can be used to answer several questions related to the growth of the spectral measure and, for discrete spectrum, to the density of eigenvalues. For example, I will present a criterion for a canonical system to have resolvents belonging to a Schatten–von Neumann class with small index, e.g., trace class. The density of eigenvalues of a canonical system in limit circle case can be described in a particularly elegant way. Namely, one counts the number of points in certain partitions of the base interval, corresponding to the rotation of the Hamiltonian, and repeats this for decreasing "grain sizes". The function mapping the grain size to the number of partitioning points is then closely related to the eigenvalue counting function.
In the final part of the talk I will consider canonical systems associated with indeterminate Hamburger moment problems, making use of the algorithmic method described above. Under mild well-behavedness assumptions, the growth of the monodromy matrix can be computed explicitly. As an application, I determine the order of a Jacobi matrix with power asymptotics whenever limit circle case takes place.

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