
YUFANG HAO, Department of Applied Math, University of Waterloo, Waterloo, ON N2L 3G1

Spectra of Self-Adjoint Extensions of a Symmetric Operator with Deficiency Indices (1, 1) and Application in Sampling Theory

This talk will discuss the spectra of self-adjoint extensions of unbounded simple symmetric operators T with deficiency indices $(1, 1)$. Any $(1, 1)$ -symmetric operator T has a $U(1)$ -family of self-adjoint extensions, say $T(\alpha)$, for $0 \leq \alpha < 2\pi$. If one of self-adjoint extension, say $T(0)$ at $\alpha = 0$, has a set of discrete spectra with no accumulation point, then each self-adjoint operator $T(\alpha)$ has a set of discrete eigenvalues $\{t_n(\alpha)\}_{n=-\infty}^{\infty}$, and together they cover the real line exactly once. Further, given the spectra of $T(0)$ and the corresponding derivatives defined as $t'_n(\alpha) = \frac{dt_n(\alpha)}{d\alpha}$, one can obtain an explicit formula for computing the eigenvalues of all other self-adjoint extensions of T . This provides a computational realization of the abstract Cayley transform. As an application, we will show results on a new generalized sampling theory.