

The Taylor spectrum of pairs of isometries

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In the talk, we discuss the Taylor spectrum of pairs of commuting isometries on a Hilbert space. In particular, we describe the Taylor spectrum of pairs of isometries given by diagrams.

Namely, let $J = \bigcup_{j=-\infty}^{\infty} \{(i, j) \in \mathbb{Z}^2 : M_j \leq i\}$ for some non-increasing sequence $\{M_i\}_{i=-\infty}^{\infty} \subset \mathbb{Z} \cup \{\infty\} \cup \{-\infty\}$ and

$$\begin{aligned} \rho_- &:= \lim_{n \rightarrow \infty} \sup_{j \leq 0} \frac{M_{j-n} - M_j}{n}, & \rho_+ &:= \lim_{n \rightarrow \infty} \sup_{j \geq -1} \frac{M_j - M_{j+n}}{n}, \\ \delta_- &:= \lim_{n \rightarrow \infty} \inf_{j \leq 0} \frac{M_{j-n} - M_j}{n}, & \delta_+ &:= \lim_{n \rightarrow \infty} \inf_{j \geq -1} \frac{M_j - M_{j+n}}{n}, \end{aligned}$$

then

$$\sigma_T(M_w, M_z) = \{(\mu, \lambda) \in \overline{\mathbb{D}}^2 : |\mu|^{\max(\rho_-, \rho_+)} \leq |\lambda| \leq |\mu|^{\min(\delta_-, \delta_+)}\},$$

where M_w, M_z are left multiplications by the independent variables "w" and "z" on $H_J(\mathcal{H}) := \overline{\text{Span}\{w^i z^j : (i, j) \in J\}}$.

The talk is based on joint work with Zbigniew Burdak.

- [1] Z. Burdak, P. Pagacz: The Taylor spectrum of pairs of isometries,
<https://arxiv.org/abs/2410.24067>, 2024.