Dilation on an annulus, K-spectral set and interplay with certain varieties in the biball

Nitin Tomar (Indian Institute of Technology Bombay, Powai, India)

A Hilbert space operator T is said to be an $\mathbb{A}_r$-*contraction* if the closure of the annulus

$$\mathbb{A}_r = \{z \in \mathbb{C} \ : \ r < |z| < 1\} \qquad (0 < r < 1)$$

is a spectral set for T. Agler proved the success of rational dilation on $\overline{\mathbb{A}}_r$ in [1]. We prove this famous theorem of Agler in an alternative way by an application of a result due to Dritschel, Jury and McCullough from [2]. We associate with $\mathbb{A}_r$-contractions a certain variety in the closure of the biball $\mathbb{B}_2 = \{(z_1, z_2) \in \mathbb{C}^2 : |z_1|^2 + |z_2|^2 < 1\}$ and study the interplay between them. We also find the minimal spectral sets for $\mathbb{A}_r$-contractions and closely related classes of operators.

This talk is based on joint work with Prof. Sourav Pal.

[1] J. Agler, Rational dilation on an annulus, *Ann. of Math.*, 121 (1985), 537–563.

[2] M. Dritschel, M. Jury and S. McCullough, Dilations and constrained algebras, *Oper. Matrices*, 10 (2016), 829 – 861.

[3] S. McCullough, Matrix functions of positive real part on an annulus, *Houston J. Math.*, 21 (1995), 489 – 506.

[4] S. Pal and N. Tomar, *Dilation on an annulus, K-spectral set and interplay with certain varieties in the biball*, Preprint.