

Commuting pairs of multiplication operators on reproducing kernel Hilbert spaces over Reinhardt domains

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I will discuss joint work with J. Yoon on the spectral properties of commuting 2-variable weighted shifts. Due to their symmetry properties, these operators can be modelled as multiplication operators acting on reproducing kernel Hilbert spaces over Reinhardt domains. By contrast with all previously known results in the theory of (single and 2-variable) weighted shifts, we show that the Taylor essential spectrum can be disconnected. We do this by obtaining a simple sufficient condition that guarantees disconnectedness, based on the norms of the horizontal slices of the shift. We also show that for every $k \geq 1$ there exists a k -hyponormal 2-variable weighted shift whose horizontal and vertical slices have 1- or 2-atomic Berger measures, and whose Taylor spectrum is disconnected.

We use tools and techniques from multivariable operator theory, and from the groupoid machinery developed by the author and P. Muhly to analyze the structure of the C^* -algebra generated by multiplication operators acting on the Bergman space of an arbitrary Reinhardt domain. As a by-product, we show that, for 2-variable weighted shifts, the Taylor essential spectrum is not necessarily the boundary of the Taylor spectrum.