von Neumann’s inequality
for commuting weighted shifts

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von Neumann’s inequality asserts that if $T$ is a contraction on a Hilbert space and $p$ is a polynomial, then

$$||p(T)|| \leq \sup\{|p(z)| : |z| \leq 1\}.$$ 

While Andô’s dilation theorem implies an analogous inequality for pairs of commuting contractions, the corresponding statement for triples of commuting contractions is false. The first counterexamples were found by Kaijser–Varopoulos and Crabb–Davie in the early seventies, but this phenomenon is still not well understood.

I will talk about a result which shows that von Neumann’s inequality holds for a particularly tractable class of commuting contractions, namely multivariable weighted shifts. This provides a positive answer to a question of Lubin and Shields from 1974.

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