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Noncommutative completely positive kernels and noncommutative interpolation

Abstract

In free noncommutative function theory one replaces functions between vector spaces by functions between disjoint unions of square matrices over these vector spaces that respect matrix size, direct sums, and similarities. The respect of similarities has striking consequences, akin to the Cauchy–Riemann equations in the usual function theory. Noncommutative completely positive kernels play the same role in free noncommutative function theory as usual positive kernels play in usual function theory; they are in fact a simultaneous generalization of both usual positive kernels and of completely positive maps. They also provide a key technical ingredient for the noncommutative counterparts of the classical interpolation problems. I will discuss some aspects of these topics, including a large class of noncommutative domains that have a striking extension property: any bounded noncommutative function defined on a relatively similarity invariant full noncommutative subset can be extended to all of the domain without increasing its supremum norm. This is a joint work with J. Ball and G. Marx.

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