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Positive definite operator functions on groups and related multilinear operators on products of Banach-*-algebras

For $k = 1, \ldots, r$, let A_k be a Banach *-algebra with an approximate identity, and let B be a C^*-algebra. An r-linear map $\Phi : A_1 \times \ldots \times A_r \to B$ is said to be Schur-completely positive if $\Phi_n(C_1^* C_1, \ldots, C_r^* C_r) \geq 0$ for all positive integers n and all $C_k \in M_n(A_k)$, $k = 1, \ldots, r$, where $\Phi_n(C_1, \ldots, C_r) = (\Phi(c_{ij1}, \ldots, c_{ijr}))$ for $C_k = (c_{ijk})$. There is a Stinespring type representation theorem for such maps, and if each A_k is commutative, the positivity of Φ already implies its Schur-complete positivity. For a Hilbert space H, positive definite $L(A_r, L(H))$-valued functions on locally compact groups in the sense of Holevo are closely related to Schur-completely positive maps, and the representation theorem for the latter can be used to prove a Riesz type decomposition theorem for such functions.