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Spectral decompositions in finite von Neumann algebras

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Linear operators on finite dimensional spaces can be analyzed in terms of their spectra using Schur's upper triangular form and Jordan's canonical form. Regarding spectral analysis for operators on infinite dimensional Banach spaces, Dunford (in the 1950's) introduced the notions of spectral operators and operators of scalar type, while Apostol and Foias (in the 1960's) introduced the notion of decomposable operators. About a decade ago, Haagerup and Schultz, studying elements of finite von Neumann algebras, proved existence of invariant projections that behave well with respect to Brown measure, which is a sort of spectral distribution. We use these invariant projections to construct analogues of Schur's upper triangular forms for such operators, and explore connections to decomposability and specrality of elements of finite von Neumann algebras. This includes joint work with Ian Charlesworth, Amudhan Krishnaswamy-Usha, Joseph Noles, Fedor Sukochev and Dmitriy Zanin.

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