

Probabilistic Operator Algebra Seminar

Organizer: Dan-Virgil Voiculescu

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Title: *On operator-valued R -diagonal and Haar unitary elements (Joint work with John Griffin)*

R -diagonal elements are naturally defined by conditions on the free cumulants of the pair consisting of the element and its adjoint. In the tracial, scalar-valued context, it is known (due to pioneering work of Nica and Speicher) that being R -diagonal is equivalent to having the same $*$ -distribution as an element with a polar decomposition $z = u|z|$, where u and z are $*$ -free and where u is a Haar unitary. In the operator-valued context (namely B -valued where B is an operator algebra), this is no longer the case. Freeness need not occur, and even notions of Haar unitary are more complicated in the operator-valued setting. We will (1) examine different notions of operator-valued Haar unitary (2) introduce the notion of a free bipolar decomposition and (3) discuss a specific result about free bipolar decompositions of B -valued circular elements (which are a very special case of B -valued R -diagonal elements) when B is two-dimensional.