Probabilistic Operator Algebra Seminar

Organizer: Dan Virgil Voiculescu

Monday, 9:00–10:30 am, to attend via Zoom email David Jekel (djekel@uottawa.ca) remot

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Nov 30 **Hari Bercovici**, Indiana University at Bloomington

The hyperinvariant subspace problem

Among the results announced by Open AI, there is a solution of the hyperinvariant subspace problem: there is an operator T on a Hilbert space that is not a scalar multiple of the identity, does have nontrivial invariant subspaces, but none of these subspaces is invariant under every operator in the commutant of T. In particular, the commutant (T)' is a nonselfadjoint transitive algebra. The construction uses weighted shifts with few invariant subspaces, and a modicum of ergodic theory: a transformation known as an odometer. The resulting operator T is quasinilpotent. I will argue that the example is correct. Moreover, the example can be modified so that it yields a contraction with essential spectrum equal to the closed unit disk. Such contractions are known to have a large variety of invariant subspaces, and one could ask whether the techniques used to produce these subspaces can be improved to yield a hyperinvariant subspace.