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- Approximate Spectral Conditions.

  Recently, there have been studies on weakened and "approximate" forms of certain spectral conditions previously known to imply commutativity, reducibility, or simultaneous triangularizability of semigroups of operators on a complex vector space. For example, Janez Bernik and I have proved that for compact groups of operators the condition

  $r(AB - BA) < 3^{1/2}$ for all A and B in the group

  (where r denotes the spectral radius) implies commutativity of the group; the previous stronger condition, used by Guralnick and giving the same conclusion was $r(AB - BA) = 0$ for all A and B. For a large class of groups, a suitably normalized condition yields reducibility of the group. Another instance of this type of study is a recent work by L. Marcoux, M. Mastnak, and the writer of these lines, generalizing the well known theorem of Specht. The latter says that if every word in A and A^* has the same trace as that word in B and B^*, then A and B are unitarily equivalent. We considered the situation where these traces are merely assumed to be "close." The simplest case is that of unitary A and B for which it is sufficient to assume that the difference between the said traces be at most 1. There are many spectral conditions whose approximate forms could be studied for various collections of operators.

- Transitivity and Related Questions.

  As my talk will indicate, there are questions on transitivity and semitransitivity of various collections, e.g. semigroups or linear spaces of operators on a finite-dimensional space, that arise naturally. Some of these have interesting "k-step" forms that can be studied.