

Reducing subspaces of tensor products of operators and representation of permutation group

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Abstract: For a complex Hilbert space H , the d -copy tensor product of H is denoted by $H^{\otimes d}$. For a class of tensor products of operators on $H^{\otimes d}$ which are invariant under a subgroup of the permutation group of d element, we identify their reducing subspaces. These reducing subspaces are formally (or implicitly) known through Schur-Weyl duality in the group representation theory where finite dimensional vectors spaces and the invertible similarity are general used. In this paper, we state these results in the operator theoretic framework which deals with infinite dimensional complex Hilbert spaces and uses the unitary similarity. We explicitly display some of these reducing subspaces. Most importantly we initiate the investigation of the question for which operator these reducing subspaces are minimal.