

Distribution Of Spectra In A Direct Sum Decomposition Of Some Classes Of Operators

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Abstract:

The existence of direct sum decompositions and factorizations of bounded linear operators acting on a Hilbert space appears to be one of the most difficult questions in the theory of linear operators. The direct sum decomposition problem is closely related to the invariant subspace problem, which to date has very few affirmative answers regarding it. In this research project we study the spectra in a direct sum decomposition and factorization of some classes of operators in Hilbert spaces with a view to determining how some distinct parts of this spectra behave in direct summands of these operators especially when one of the summands is missing and eventually how quasisimilarity as a relaxation of similarity affects this summands. This thesis is organized as follows: Chapter 1 is an introduction and is devoted largely to notations and terminologies and examples of various concepts that we shall use in the rest of this thesis. Chapter 2 deals with the spectra of orthogonal direct of some classes of operators with a normal and a completely non-normal part. In this chapter we show the general behavior of ", constituent parts of spectra in some classes of the decomposed operators. Chapter 3 is on the decomposition of a contraction operator into a unitary and a completely non-unitary (c.n.u.) parts. We show that a general bounded operator enjoys this decomposition upon re-normalization (by dividing the operator by its norm). We pay special attention to the c.n.u parts of an operator and the shift operators which play a very important role in this kind of decomposition. Chapter 4 lays more emphases in uniting these two aspects and checking out the distribution of the spectra in a direct sum decomposition of some classes of quasismilar operators.