

Title: Unified min-max and interlacing theorems for linear operators

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Abstract: There exist striking analogies in the behaviour of eigenvalues of Hermitian compact operators, singular values of compact operators and invariant factors of homomorphisms of modules over principal ideal domains, namely diagonalization theorems, interlacing inequalities and Courant-Fischer type formulae. Carlson and Sa [D. Carlson and E.M. Sa, Generalized minimax and interlacing inequalities, Linear Multilinear Algebra 15 (1984) pp. 77-103.] introduced an abstract structure, the s-space, where they proved unified versions of these theorems in the finite-dimensional case. We show that this unification can be done using modular lattices with Goldie dimension, which have a natural structure of s-space in the finite-dimensional case, and extend the unification to the countable-dimensional case.

Author Keywords: Goldie Dimension; Modular Lattice; Eigenvalues; Invariant Factors; Compact Operators

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