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ON THE IDEAL STRUCTURE OF POSITIVE, EVENTUALLY COMPACT LINEAR OPERATORS ON BANACH LATTICES

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We study the structure of the algebraic eigenspace corresponding to the spectral radius of a nonnegative reducible linear operator T, having a compact iterate and defined on a Banach lattice E with order continuous norm. The Perron-Frobenius theory is generalized by showing that this algebraic eigenspace is spanned by a basis of eigenelements and generalized eigenelements possessing certain positivity features. A combinatorial characterization of both the *Riesz index* of the spectral radius and the dimension of the algebraic eigenspace is given. These results are made possible by a decomposition of T, in terms of certain closed ideals of E, in a form which directly generalizes the Frobenius normal form of a nonnegative reducible matrix.

I. Introduction. Let E be a Banach lattice, and $\mathbf{T}$, a positive reducible linear operator mapping E into itself and having a compact iterate. Suppose, in addition, that $r(\mathbf{T})$, the spectral radius of $\mathbf{T}$, is positive. The primary purpose of this research is to ascertain, under what conditions on the Banach lattice E, a decomposition of $\mathbf{T}$ is possible, which turns out to be a natural generalization of the Frobenius normal form for reducible matrices. These properties will be seen to generalize those deduced by U. Rothblum [**13**] for the matrix setting, and those by H. D. Victory, Jr. for integral operators on L^p-spaces, $1 \leq p < \infty$, with the underlying measure being σ-finite [**16**, **17**] on a domain set Ω.

We refer the reader to the treatise by H. H. Schaefer [**15**] for an explanation of the notation used in this work and of the lattice concepts of ideals, order convergence and completeness, bands, projection bands, operator-invariant ideals, and (uniform) mean ergodicity of an operator $\mathbf{T}$. By $\mathfrak{L}(E)$, we mean the Banach space of bounded linear endomorphisms of E.

The underlying Banach lattice E will be assumed equipped with an *order continuous norm.* In such Banach lattices, every filter that order converges norm converges. Such lattices are characterized by the fact that every closed ideal is a band [**15**, Theorem 5.14 (Chapter II)]. Since