SPECTRALLY INVARIANT SUBSPACES OF A BOUNDED LINEAR OPERATOR

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A proper lattice of $X$ is a pair $(A, L)$ composed by a bounded linear operator $A$ on $X$ and its invariant finite-dimensional subspace $L$. The set of all proper lattices of $X$ we denote $Pl(X)$. For $(A, L) \in Pl(X)$, the operator $A$ induces two operators, the restriction operator $A|_L$ and the operator $\hat{A}_L$ from the quotient $X/L$ into itself, i.e. $\hat{A}_L(\pi(y)) = \pi(A(y))$, where $\pi$ is the natural homeomorphism between $X$ and the quotient space $X/L$.

In this note it’s shown that $(A, L)$ is a proper lattice if and only if there are the finite sequence of eigenvalues $\{\lambda_1, \ldots, \lambda_n\} \in \sigma_p(A)$ and the appropriate set of linear independent eigenvectors $\{x_1, \ldots, x_n\}$ such that $L = \mathcal{L}(x_1, \ldots, x_n)$. Moreover, $\lambda_i$ is a simple pole of $A$ if and only if $\lambda_i \notin \sigma(\hat{A}_L)$.

Follow this concept we can define spectrally invariant (finite dimensional) subspaces of linear operator $T$ like invariant subspace $E$ such that $\sigma(T|_E) \cap \sigma(\hat{T}_E) = \emptyset$.

Also, we gave it some properties of stability of spectrally invariant subspaces.

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