

Domanov, I. Yu.; Malamud, M. M.

On the spectral analysis of direct sums of Riemann-Liouville operators in Sobolev spaces of vector functions. (English) [Zbl 1220.47009](#)

[Integral Equations Oper. Theory](#) 63, No. 2, 181-215 (2009).

Summary: Let J_k^α be a real power of the integration operator J_k defined on the Sobolev space $W_p^k[0, 1]$. We investigate the spectral properties of the operator $A_k = \bigoplus_{j=1}^n \lambda_j J_k^\alpha$ defined on $\bigoplus_{j=1}^n W_p^k[0, 1]$. Namely, we describe the commutant $\{A_k\}'$, the double commutant $\{A_k\}''$ and the algebra $\text{Alg } A_k$. Moreover, we describe the lattices $\text{Lat } A_k$ and $\text{HypLat } A_k$ of invariant and hyperinvariant subspaces of A_k , respectively. We also calculate the spectral multiplicity μ_{A_k} of A_k and describe the set $\text{Cyc } A_k$ of its cyclic subspaces. In passing, we present a simple counterexample for the implication

$$\text{HypLat}(A \oplus B) = \text{HypLat } A \oplus \text{HypLat } B \Rightarrow \text{Lat}(A \oplus B) = \text{Lat } A \oplus \text{Lat } B$$

to be valid.

MSC:

[47A15](#) Invariant subspaces of linear operators

[47A16](#) Cyclic vectors, hypercyclic and chaotic operators

[47L80](#) Algebras of specific types of operators (Toeplitz, integral, pseudodifferential, etc.)

[47L10](#) Algebras of operators on Banach spaces and other topological linear spaces

Cited in **6** Documents

Keywords:

[Riemann-Liouville operator](#); [invariant subspace](#); [hyperinvariant subspace](#); [commutant](#); [double commutant](#)

Full Text: [DOI](#) [arXiv](#)