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On Finite Elements in Vector Lattices of Operators

In Archimedean vector lattices the notion of a finite element simulates a continuous function with compact support in abstract setting. Besides exhaustive studies of finite elements, in particular vector lattices and Banach lattices, the investigation of finite elements in vector lattices consisting of operators is also of interest and yields some interesting results. The main results up to now are obtained for the vector lattice of all regular operators between two vector lattices. So the orthomorphisms in and the lattice isomorphisms between Dedekind complete Banach lattices are finite elements. If E, F are Banach lattices with F reflexive, then an operator is a finite element if and only if its adjoint is finite. Any regular operator defined on an AL-space which has its images in a Dedekind complete AM-space with order unit is a finite element. Vice versa, if for two Banach lattices E, F with F Dedekind complete each regular operator mapping E into F is a finite element, then E is lattice isomorphic to an AL-space and F lattice isomorphic to an AM-space (not necessary with order unit). Not each finite rank operator is a finite element. However, if the constituents of such an operator are finite elements in their corresponding vector lattices then the operator is a finite element.