İSTANBUL ANALYSIS SEMINARS

ON OPERATORS WHOSE COMPACTNESS PROPERTIES ARE DEFINED BY ORDER

Şafak ALPAY

Middle East Technical University
Department of Mathematics

Abstract: Let E be a Banach lattice. A subset B of E is called *order bounded* if there exist a, b in E such that $a \leqslant x \leqslant b$ for each $x \in B$. Considering E in E'', the bidual of E, a subset B of E is called *b-order bounded* in E if it is order bounded in the Banach lattice E''. A bounded linear operator $T : E \to X$ is called *o-weakly compact* if $T(B)$ is relatively weakly compact for each order bounded set B in E. T is called *b-weakly compact* if $T(B)$ is relatively weakly compact for each b-order bounded subset B in E. T is called an operator of *strong type B* if $T(B(E)) \subset X$, where $B(E)$ is the band generated by E in E''. Let these spaces be denoted by $W_o(E,X)$, $W_b(E,X)$, and $W_{st}(E,X)$, respectively, and let $W(E,X)$ be the space of weakly compact operators between E and X. In general, we have

$$W(E,X) \subseteq W_{st}(E,X) \subseteq W_b(E,X) \subseteq W_o(E,X)$$

between the spaces introduced above, where containments may be strict. We study the pair of spaces where equalities hold above and show how the equalities of these spaces help to characterize various properties of E and X.

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