

# ABSTRACT

## ON ASYMPTOTIC PROPERTIES OF POSITIVE OPERATORS ON BANACH LATTICES

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In this thesis, we study two problems. The first one is the renorming problem in Banach lattices. We state the problem and give some known results related to it. Then we pass to construct a positive doubly power bounded operator with a non-positive inverse on an infinite dimensional AL-space which generalizes the result of [10].

The second problem is related to the mean ergodicity of positive operators on KB-spaces. We prove that any positive power bounded operator  $T$  in a KB-space  $E$  which satisfies

$$\lim_{n \rightarrow \infty} \text{dist} \left( \frac{1}{n} \sum_{k=0}^{n-1} T^k x, [-g, g] + \eta B_E \right) = 0 \quad (\forall x \in E, \|x\| \leq 1), \quad (*)$$

where  $B_E$  is the unit ball of  $E$ ,  $g \in E_+$ , and  $0 \leq \eta < 1$ , is mean ergodic and its fixed space  $\text{Fix}(T)$  is finite dimensional. This generalizes the main result of [12]. Moreover, under the assumption that  $E$  is a  $\sigma$ -Dedekind complete Banach lattice, we prove that if, for any positive power bounded operator  $T$ , the condition (\*) implies that  $T$  is mean ergodic then  $E$  is a KB-space.

Keywords : Positive isometry, (doubly) power bounded operator, renorming problem, AL-spaces, mean ergodicity, KB-spaces.