

Abstract: In this work we study covering theorems and their applications. Apart from classic covering theorems (Vitali, Besicovitch and Whitney theorem) we state some of their generalizations and some other covering theorems. We use them then to prove other theorems. Typical applications are for example Lebesgue differentiation theorem, weak type $(1,1)$ of maximal operator or Lemma of Calderón and Zygmund, in their proves covering theorems are essential. We also deal with inequalities containing operators. Covering theorems help us to prove some relations among the maximal operator of Hardy and Littlewood, the maximal singular integral operator and the sharp maximal operator.