

MIXED MEANS, HARDY TYPE INEQUALITIES AND MAXIMAL FUNCTIONS

IVAN PERIĆ

FACULTY OF FOOD TECHNOLOGY AND BIOTECHNOLOGY, UNIVERSITY OF ZAGREB, CROATIA

ABSTRACT. We prove inequalities for mixed power means for averaging operators which average functions over several scaled families of subsets of \mathbb{R}^n such as rectangles, balls, spheres and similar. Motivation can be found in considering collection of subsets of \mathbb{R}^n which differentiate suitable functions on \mathbb{R}^n . Guided by this motivation we distinguish centered and uncentered cases. As a direct consequence of the mixed-means inequalities we deduce the Hardy type inequalities i.e. the operator norms of the averaging operators on L^p spaces. An interesting and important feature of these norms is that they are lower bounds for operator norms of appropriate maximal functions. Further, they can give asymptotic behavior of the operator norms of maximal functions for large n and fixed $p > 1$.