ALMOST GREEDY UNIFORMLY BOUNDED ORTHONORMAL BASIS IN REARRANGEMENT INVARIANT BANACH SPACES

Ana Danelia*, **Ekaterine Kapanadze**

Department of Mathematics, I. Javakhishvili Tbilisi State University, Tbilisi, Georgia
[a.danelia@math.sci.tsu.ge]

2000 Mathematics Subject Classification. 41A17, 42C40

Keywords and phrases. Greedy approximation, Banach spaces.

Let $\{x_n\}_{n\in\mathbb{N}}$ be a semi-normalized basis in a Banach space X. The main question in approximation theory concerns the construction of efficient algorithms for m-term approximation. A computationally efficient method to produce m-term approximations is the so called greedy algorithm. We define the greedy approximation of $x = \sum_n a_n x_n \in X$ as $\mathcal{G}_m(x) = \sum_{n\in A} a_n x_n$, where $A \subset \mathbb{N}$ is any set of the cardinality m in such a way that $|a_n| \geq |a_l|$ whenever $n \in A$ and $l \overline{\in} A$. A bounded Schauder basis for a Banach space X is almost greedy if there exists a constant C such that for $x \in X$, $\|x - \mathcal{G}_m(x)\| \leq C \inf\{\|x - \sum_{n\in A} < x, x_n > x_n\| : A \subset \mathbb{N},\ |A| = m\}$.

In the given work we construct the uniformly bounded orthonormal almost greedy basis in the r.i. function spaces. Namely, the following theorem is obtained.

Theorem. *Let X be a separable r.i. Banach function space on $[0,1]$ and $1 < p_X \leq q_X < 2$ or $2 < p_X \leq q_X < \infty$. Then there exists a uniformly bounded orthogonal almost greedy basis in X.*