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**LOCALLY PIECEWISE LINEAR APPROXIMATION IN THE WEIGHTED SOBOLEV SPACES**

Let $G$ is an open bounded set in $R^n$ , $L_k$ and $H_k$ are the k-dimensional Lebesgue and Hausdorf measures, $A_p$ is class of locally integrable functions $w : R^n \to (0, \infty)$ satisfying the Muckenhoupt condition [1]

$$\sup \frac{1}{|Q|} \int\limits_Q w\, dx \left( \frac{1}{|Q|} \int\limits_Q w^{1-q}\, dx \right)^{p-1} < \infty,$$

where the supremum is taken over all coordinate cubes $Q \subset R^n$, $|Q| = L_n(Q)$; $p, q \in (1, \infty)$ and $\frac{1}{p} + \frac{1}{q} = 1$.

For a weight function $w \in A_p$, by $L^1_{p,w}(G)$ denote the class of function $u : G \to (-\infty, +\infty)$, that are locally integrable in $G$, have generalized partial derivatives on $G$, and satisfy the condition $\int\limits_G |\nabla u|^p\, w\, dx < \infty$.

Proof is based on the methods of the paper [2].

**Theorem 1.** *For any $\varepsilon > 0$ and any function $u \in L^1_{p,w}(G)$, there is continuous locally piecewise linear function $L(x) \in L^1_{p,w}(G)$* such that

$$\int\limits_G |\nabla u - \nabla L)|^p \cdot w\, dx < \varepsilon.$$

Similar the statement were formulated for admissible function $u$ in a problem of conformal capacity [3], [4], in that specific case, when $p = n$ and $G$ − ring or shell in $R^n$.

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# References

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