On a boundary behavior of regular solutions to the degenerate Beltrami equations

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The *Beltrami equation* is the equation of the form

$$f_{\overline{z}} = \mu(z) \cdot f_z \,, \tag{1}$$

where $|\mu(z)| < 1$ a.e. in $\mathbb{C}$. A homeomorphism f of the Sobolev class $W^{1,1}_{\rm loc}$ is called a *regular solution* of the Beltrami equation (1) if f satisfies (1) a.e. and its Jacobian $J_f(z) = |f_z|^2 - |f_{\overline{z}}|^2 > 0$ a.e. in $\mathbb{C}$. The Beltrami equation (1) is called *degenerate* if $K_\mu(z) = (1 + |\mu(z)|) \,/\, (1 - |\mu(z)|) \notin L^\infty$. A mapping $f : \mathbb{C} \to \mathbb{C}$, $f(0) = 0$, is called *asymptotically homogeneous at the origin* if $\lim_{z\to 0, z\in\mathbb{C}\setminus\{0\}} f(z\zeta)/f(z) = \zeta$ for all $\zeta \in \mathbb{C}$. If the family of functions $f_\eta(z) = f(z + \eta) - f(\eta)$ satisfies this condition uniformly with respect to η belonging to a given set, then such a family is called *uniformly asymptotically homogeneous* on a given set.

The necessary and sufficient conditions for uniform asymptotic homogeneity at the point of a family of regular solutions to the degenerate Beltrami equations are obtained. We also investigated a boundary behavior of such a family. These results have applications to the investigation of some equations of mathematical physics, see [1].

[1] *V.Ya. Gutlyanskii, T.V. Lomako, V.I. Ryazanov,* To the theory of variational method for Beltrami equations // Ukr. Mat. Visn., **8** (2011), N 4, p. 513–536; transl. in J. Math. Sci., **182** (2012), N 1, p. 37–54.