İSTANBUL ANALYSIS SEMINARS

RATIO ASYMPTOTICS FOR HARMONIC MEASURES OF SLIT SLIDES

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Abstract: Let a simply connected domain D have a slit E as a part of its boundary. Denote by E_1 and E_2 the two sides of the slit. We will solve a problem about an estimate of a ratio of two harmonic measures $\omega(0, f(E_k), \mathbb{D})$, $k = 1, 2$, for $f : D \to \mathbb{D}$ or $\omega(0, f(E_k), \mathbb{H})$, $k = 1, 2$, for $f : D \to \mathbb{H}$.

We mention the Bazilevich-Lukas problem on estimating the ratio of harmonic measures for sides of the slit E in the complex plane $\mathbb{C}$ in the case when the slit goes to infinity and at every its point the slit and the radial direction form an angle which does not exceed α, $0 \leq \alpha < \frac{\pi}{2}$.

We estimate a ratio of harmonic measures of sides $\gamma_k(t)$, $k = 1, 2$, of a smooth slit $E = \gamma(t)$ in the upper half-plane $\mathbb{H}$ which is perpendicular to the real axis. There are similar results for a slit $\gamma(t)$ which is not perpendicular to the real axis.

For a circular slit $\gamma(t)$ of radius 1 in the upper half-plane which is tangential to the real axis, we find the driving function $\lambda(t)$ in the Loewner equation generating mappings $f(z, t)$ from the upper half-plane onto the slit domain. We propose certain conjectures on a connection between the Hölder order of a driving function and an order of tangency of the corresponding slit in the upper half-plane. We present some results for slits generated by driving functions from the class $\text{Lip}(\frac{1}{n})$.

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