
ALEX STOKOLOS, Georgia Southern University
“An extremal problem for polynomials”

In 1987 M.Brandt solved the extremal problem

$$\sup_{a_2, \dots, a_N} \left(\inf_{z \in \mathbb{D}} \{ \Re(F(z)) : \Im(F(z)) = 0 \} \right)$$

for the univalent in \mathbb{D} polynomials $F(z) = \sum_{j=1}^N a_j z^j$ with real coefficients and normalization $a_1 = 1$. He proved that the solution is $-\frac{1}{4} \sec^2 \frac{\pi}{N+2}$, and found the extremal polynomial. We prove that the above problem stated for general (not necessary univalent) polynomials has the same solution and the same extremizer. Moreover, we prove the uniqueness of the extremizer and obtain the estimate on the Koebe radius for polynomials in various settings. This is a joint work with Dmitriy Dmitrishin and Andrey Smorodin.