
Lehel Banjai and Lloyd N. Trefethen

Numerical Solution of the Omitted Area Problem of Univalent Function Theory

CMFT 1 No.1 (2001), 259–273. [ISSN 1617-9447]

Abstract. The omitted area problem was posed by Goodman in 1949: what is the maximum area \mathcal{A}^* of the unit disk \mathbb{D} that can be omitted by the image of the unit disk under a univalent function normalized by $f(0) = 0$ and $f'(0) = 1$? The previous best bounds were $0.240005\pi < \mathcal{A}^* \leq .31\pi$. Here the problem is addressed numerically and it is found that these estimates are slightly in error. To ten digits, the correct value appears to be $\mathcal{A}^* = 0.2385813248\pi$.

Keywords. Omitted area problem, numerical conformal mapping, univalent function theory.

2000 MSC. 30C30, 30C75, 65E05.

Received. December 5, 2001, in revised form March 13, 2002.