

USING CIRCLE PACKINGS TO APPROXIMATE HARMONIC MEASURE DISTRIBUTION FUNCTIONS

ELLA WILSON

Communicated by Paul Eloe

ABSTRACT. *Harmonic measure distribution functions, h -functions*, encode information about the geometry of domains in the plane. Specifically, given a domain and a basepoint in the domain, for a fixed radius, r , the value $h(r)$ is the probability that a Brownian particle first exits the domain within distance r of the basepoint. There are many domains for which we can compute h -functions, such as the disk and the inside and outside of a wedge. However, exact computation is often difficult or impossible for more complicated domains, so we need methods to approximate these h -functions. In this paper, we develop two methods for approximating h -functions using circle packings to discretize domains. We also discuss connections to open questions in the field of h -functions.

KEYWORDS: *Circle packing, Conformal invariance, Harmonic measure distribution function*

MSC (2010): Primary 52C26, Secondary 30C85, 30C20

DEPARTMENT OF MATHEMATICS, KENYON COLLEGE, GAMBIER, OH 43022, USA

E-mail address: wilson4@kenyon.edu

Received December 31, 2021; revised April 3, 2022.