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On Riemann-Hilbert Problems in Circle Packing

CMFT 9 No.2 (2009), 609–632. [ISSN 1617-9447]

Abstract. We propose a discrete counterpart of non-linear boundary value problems for holomorphic functions (Riemann-Hilbert problems) in the framework of circle packing. For packings with simple combinatorial structure and circular target curves appropriate solvability conditions are given and the set of all solutions is described. We compare the discrete and the continuous setting and discuss several discretization effects. In the last section we indicate promising directions for further research and report on the results of some test calculations which show that solutions of the circle packing problem approximate the classical solutions surprisingly well.

Keywords. Riemann-Hilbert problems, circle packing, conformal geometry, hyperbolic geometry.

2000 MSC. Primary 30E25; Secondary 52C26, 30C35, 30C80.

Received. November 19, 2008, in revised form April 6, 2009.

Published online. June 1, 2009.