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The correspondence between unicritical polygons and maximally multicritical polygons

Brittany Burdette (University of Alabama at Birmingham)
beburd@uab.edu

Abstract: The purpose of this research is to establish the correspondence between unicritical polygons and maximally multicritical polygons in a lamination. We break this correspondence down into three cases: identity return polygons, rotational polygons, and rotation return polygons. The single criticality in the unicritical situation splits into the maximal number of criticalities possible. The process of breaking the criticality uses the co-roots of the major (longest leaf) which are points, other than the endpoints of the polygons, in the boundary of the central gap of the lamination that is fixed under the first return map. When starting specifically with the maximally multicritical rotational polygons, we describe the subset which can correspond back to unicritical: the majors of the rotational polygon must be in consecutive order. This relationship aids in understanding the boundary of the principle hyperbolic component of complex parameter space where all of the critical points of a complex-valued polynomial are attracted to an attractive fixed point.