

COMPLEX ANALYSIS SEMINAR

A CHARACTERIZATION OF POLYNOMIALS IN HOLOMORPHIC DYNAMICS IN ONE COMPLEX VARIABLE USING POTENTIAL THEORY

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ABSTRACT: In 1960's Hans Brolin initiated systematic application of potential-theoretic methods in the dynamics of holomorphic polynomials in one variable. Among other things, he proved the now-famous equidistribution theorem: for a polynomial f of degree greater than 1 the preimages, under successive iterates of f , of a Dirac measure at an arbitrary point of the complex plane (except at most two so-called exceptional points) converge weakly to the equilibrium measure of the Julia set for f . In 1980's a similar result (about convergence of preimages of quite general probabilistic measures) was proved for a rational map f of degree greater than 1. The limit measure obtained in this case (called the balanced measure) is also supported on the Julia set for f , but does not have to be its equilibrium measure. In fact, A.O. Lopes proved (using dynamical properties of Julia sets) that equality of these two measures (under suitable assumptions on f , also making precise the notion of the equilibrium measure for the Julia set) implies that f is a polynomial. In this talk I present a proof of Lopes's theorem (under slightly weaker assumptions) using classical and weighted potential theory. It is joint work with Yusuke Okuyama from Kyoto Institute of Technology (Okuyama, Yusuke; Stawiska, Malgorzata: Potential theory and a characterization of polynomials in complex dynamics. *Conform. Geom. Dyn.* 15 (2011), 152-159).

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