THE THEORY OF POLYNOMIAL-LIKE MAPPINGS – THE IMPORTANCE OF QUADRATIC POLYNOMIALS

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Abstract. In the field of complex dynamics and, in particular, iteration of functions of one complex variable, the topic that has by far been object of the most attention is the iteration of the family of quadratic polynomials $Q_c := z^2 + c$. In this paper we aim to answer the question of why this very particular family of polynomials is important for the understanding of iteration of general complex functions, by means of the theory of polynomial-like mappings of Douady and Hubbard. This theory explains how the understanding of polynomials is not only interesting *per sé* , but helps understand a much wider class of functions namely those that locally behave as polynomials do. Most of the definitions and results in this paper may be found in the work of Douady and Hubbard *"On the Dynamics of Polynomial-like Mappings"* [DH].Our goal is to state their most important results as well as to give several examples that illustrate them.

This is the third paper in the "Complex Dynamics" series of EWM 95. We assume that the reader is familiar with the basic definitions and theorems concerning the dynamics of quadratic polynomials which are the topic of the first article by Bodil Branner.

[DH] A. Douady & J.Hubbard, On the Dynamics of Polynomial-like Mappings, Ann. Scient., Ec. Norm. Sup. 4 e series, 18 (1985) 287343.

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