

Dynamics of a Family of Rational Operators of Arbitrary Degree

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Abstract. In this paper we analyse the dynamics of a family of rational operators coming from a fourth-order family of root-finding algorithms. We first show that it may be convenient to redefine the parameters to prevent redundancies and unboundedness of problematic parameters. After reparametrization, we observe that these rational maps belong to a more general family $O_{a,n,k}$ of degree $n+k$ operators, which includes several other families of maps obtained from other numerical methods. We study the dynamics of $O_{a,n,k}$ and discuss for which parameters n and k these operators would be suitable from the numerical point of view.

Keywords: iterative methods, parameter planes, complex dynamics of rational functions.

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