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9. Ordinary Differential Equations and Dynamical Systems

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Invariant subcontinua in Siegel and Cremer Julia sets of polynomials

We obtain results on the structure of decomposable connected Julia sets of polynomials with an irrationally indifferent fixedpoint. There is an invariant proper subcontinuum B of the Julia set containing a critical point. Either B contains a Cremer point or the boundary of a Siegel disk. We study the way in which impressions of external rays meet B, and relate the dynamics on B to the dynamics of the induced map on a Cantor set in the circle at infinity of external rays. In the Siegel case, we obtain an analog of the Pommerenke-Rodin number which gives necessary and sufficient conditions for when impressions of external rays meet in the boundary of the Siegel disk.