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9. Ordinary Differential Equations and Dynamical Systems

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Rigidity of complex quadratic polynomials and the universal Teichmüller space

We consider certain infinitely renormalizable quadratic polynomials and prove their rigidity. For the proof, we decompose the plane into Yoccoz puzzles pieces and show by analyzing combinatorial dynamics of pieces that inside a certain critical piece there are enough "good annuli" which "insulate" its inverse images from the boundary. This leads to a self-mapping of the universal Teichmüller space which is uniformly contracting. The rigidity follows from the property of the fixed point of this map.