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9. Ordinary Differential Equations and Dynamical Systems

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Using Teichmüller Geometry

We write $\mathcal{T}$ for the Teichmüller space of a compact surface S_0 with finite $A_0 \subset S_0$. The Nielsen-Thurston isotopy-classification of a homeomorphism χ of (S_0, A_0), and a topological description of $\{\phi \circ \chi \circ \psi^{-1} : [\phi] = [\psi]\}$, can be found [Bers] by analysing the set $\{[\phi] \in \mathcal{T} : d_{\mathcal{T}}([\phi], [\phi \circ \chi])$ is minimised$\}$. Now let $f_0 : (\hat{\mathbf{C}}, A_0) \to (\hat{\mathbf{C}}, A_0)$ be an orientation-preserving branched covering with critical value set V_0. We shall indicate how the calculus of Teichmüller distance assists, analogously, in a topological description of the (usually topologically infinite) space $\{\phi \circ f_0 \circ \psi^{-1} : [\phi] = [\psi]\}$.