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Abstracts

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Regularity Properties of a Nonlinear Operator Associated to the Conformal Welding

As it is well known, given a plane simple closed curve ζ with nonvanishing tangent vector, there exists a pair of suitably normalized Riemann maps (F, G), where F maps the open unit disk $\mathbb{D}$ of $\mathbb{C}$ onto the interior $\mathbb{I}[\zeta]$ of ζ, and where G maps the exterior $\mathbb{C} \setminus \mathrm{cl}\,\mathbb{D}$ of $\mathrm{cl}\,\mathbb{D}$ onto the exterior $\mathbb{E}[\zeta]$ of ζ. It is also well known that F and G can be extended to boundary homeomorphisms. Thus one can consider the conformal welding homeomorphism $F^{(-1)} \circ G_{|\partial\mathbb{D}}$, which we denote by $w[\zeta]$. Now we think both the set of simple closed curves ζ and the set of welding homeomorphisms as subsets of the Schauder space $C_*^{m,\alpha}(\partial\mathbb{D}, \mathbb{C})$ of the m times continuously differentiable complex-valued functions on $\partial\mathbb{D}$ which have m-th order derivatives which are α-Hölder continuous, with $\alpha \in]0, 1[$, $m \geq 1$. Then we present some differentiability Theorems for the dependence of $w[\zeta]$ upon ζ, and a complex analyticity result for a left inverse of $w[\cdot]$.