THE SPACE OF J-FIELDS ON A SURFACE.

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Abstract. Let S be a compact, connected surface of genus $g \geq 2$. The space $\mathbb{J}(TS)$ of all smooth fields J of endomorphism of the tangent space TS satisfying $J \circ J = -\mathrm{Id}_{TS}$ has a rich geometry: it has a metric t directly related to the hyperbolic plane, carries an integrable complex structure J° together with a symplectic functions valued form ω°. The group $\mathrm{Diff}_0(S)$ of diffeomorphism isotopic to the identity acts freely t-isometric, ω°-symplectic and J°-holomorphic on $\mathbb{J}(TS)$. The $\mathrm{Diff}_0(S)$ orbits are ω°-symplectic. This geometry leads to an elementary proof of the Uniformisation Theorem. The functions valued symplectic form ω° together with the density μ of the Poincaré metric on (S, J) defines a real valued symplectic form $\omega^{\circ,\mu}$ on $\mathbb{J}(TS)$. The $\omega^{\circ,\mu}$-orthogonal distribution to the foliation by orbits is integrable too. Its leafs are copies of the Teichmüller space $T_g = \mathbb{J}(TS)/\mathrm{Diff}_0(S)$. The restrictions of $\omega^{\circ,\mu}$ and J° to the above leafs give the Weil-Petersson geometry of Teichmüller space.

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