

Zeitschrift: L'Enseignement Mathématique
Herausgeber: Commission Internationale de l'Enseignement Mathématique
Band: 47 (2001)
Heft: 1-2: L'ENSEIGNEMENT MATHÉMATIQUE

Artikel: NEW EXAMPLES OF MAXIMAL SURFACES
Autor: Hamenstädt, Ursula

Bibliographie
DOI: <https://doi.org/10.5169/seals-65429>

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

Download PDF: 17.04.2026

ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>

On the other hand, if ζ is any closed curve on S with a minimal number of intersections with ψ_i^j in its free homotopy class, then we can remove from S three points which do not lie on ζ and such that two of these points lie on ψ_i^j . If we call the resulting surface S_∞ then ζ defines a closed curve ζ_∞ on S_∞ , and $i(\zeta, \psi_i^j)$ equals the number of intersection points between ζ_∞ and γ_i^j (where γ_i^j is given as before). This then shows that $\mathcal{J}(\zeta_\infty, \gamma_i^j) \leq i(\zeta, \psi_i^j) = i([\zeta_\infty], \psi_i^j)$ \square

As an immediate consequence of Lemma 5.6 and Lemma 5.7 we obtain

COROLLARY 5.8. *The curves ψ_i^j on S are parametrizing for \mathcal{PL} . In particular, for every $g \geq 2$ there is a family of $6g + 3$ free homotopy classes on a closed surface of genus g which is parametrizing for \mathcal{PL} .*

REMARK. From [FLP] one immediately obtains a family of $9g - 9$ closed curves on a closed surface of genus g which is parametrizing for \mathcal{PL} . To my knowledge, the minimal number of simple closed curves with this property is not known.

ACKNOWLEDGMENT. This work was motivated by computer experiments using a computer program written by Roman Koch and was completed while I visited the IHES. I thank the Institute for its hospitality.

REFERENCES

- [B] BONAHOFF, F. The geometry of Teichmüller space via geodesic currents. *Invent. Math.* 92 (1988), 139–162.
- [Bu] BUSER, P. *Geometry and Spectra of Compact Riemann Surfaces*. Birkhäuser, Boston 1992.
- [BS] BUSER, P. and P. SARNAK. On the period matrix of a Riemann surface of large genus. *Invent. Math.* 117 (1994), 27–56.
- [FLP] FATHI, A., LAUDENBACH, F. and V. POÉNARU. Travaux de Thurston sur les surfaces. *Astérisque* 66–67 (1979).
- [F] FORSTER, O. *Lectures on Riemann Surfaces*. Springer Graduate Texts in Math. 81, New York, 1981.
- [G] GARDINER, F. *Teichmüller Theory and Quadratic Differentials*. Wiley, New York, 1987.
- [I] IVERSEN, B. *Hyperbolic Geometry*. Cambridge University Press, 1992.
- [K] KERCKHOFF, S. Lines of minima in Teichmüller space. *Duke Math. J.* 65 (1992), 182–213.

- [L] LEVY, S. (editor) *The 8-Fold Way*. MSRI Publications 35, Cambridge Univ. Press, 1999.
- [M] MASKIT, B. On Poincaré's theorem for fundamental polygons. *Advances in Math.* 7 (1971), 219–230.
- [S1] SCHMUTZ, P. Riemann surfaces with shortest geodesic of maximal length. *Geom. Funct. Anal.* 3 (1993), 564–631.
- [S2] SCHMUTZ SCHALLER, P. Teichmüller space and fundamental domains of Fuchsian groups. *L'Enseignement Math.* (2) 45 (1999), 169–187.
- [S3] — Systoles and topological Morse functions for Riemann surfaces. Preprint.
- [St] STREBEL, K. *Quadratic Differentials*. Ergebnisse der Mathematik 5 (III), Springer, Berlin, 1984.
- [T] THURSTON, W. *Three-Dimensional Topology and Geometry*. Bound notes, Princeton University.
- [W] WOLPERT, S. The Fenchel-Nielsen deformation. *Ann. of Math.* (2) 115 (1982), 501–528.

(Reçu le 7 juin 2000)

U. Hamenstädt

Mathematisches Institut der Universität Bonn
Berlingstrasse 1
D-53115 Bonn
Germany
e-mail: ursula@math.uni-bonn.de

vide-leer-empty