ICM 1998, Berlin, Aug. 18–27

Abstracts of Short Communications and Posters

Section:

8. Analysis

1991 MS Classification: not given

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Unique extremal quasiconformal maps with dilatation of nonconstant modulus

Beltrami differentials of unique extremal quasiconformal maps were conjectured to have constant modulus, as they indeed do in the case of Riemann surfaces of finite genus and finite analytic type (in this case they are of the more special Teichmüller type, $M = k\frac{|\varphi|}{\varphi}$, $0 < k < 1$, φ analytic, as was the case also with all previously known examples). This conjecture is disproved by showing (in the case of unit disc Δ) that there is a unique extremal quasiconformal map with Beltrami differential M satisfying $M(Z) < \|M\|_\infty$ for a. a. $Z \in \Delta$, and that for any $\eta \in L^\infty(\Delta)$, $\|\eta\|_\infty < 1$ there is uniquely extremal dilatation M satisfying $\|M\|_\infty \leq \|\eta\|_\infty$ and $M \neq \eta$ on a set of arbitrarily small measure. The construction extends to a vast number of Riemann surfaces, including all surfaces of finite genus and infinite analytic type.

References:

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