

## A CROSS-RATIO INEQUALITY FOR QUASICIRCLES

WANG GENDI, CHU YUMING AND ZHANG XIAOHUI

*Abstract.* In this note we give a geometric characteristic for quasicircles by making use of cross-ratios, which is analogous to quadruple points identity of circles.

*Mathematics subject classification (2000):* 30C62.

*Key words and phrases:* Quasicircles, cross-ratio, Möbius mappings.

## REFERENCES

- [1] M. VUORINEN, *Conformal Geometry and Quasiregular Mappings*, Lecture notes in Mathematics, Springer-Verlag, Berlin, 1988.
- [2] J. CIEŚLIŃSKI, *The cross ratio and Clifford algebras*, Adv. Appl. Clifford Algebras, **7**(1997), 133–139.
- [3] A. BLUNCK, *Cross-ratios in Moufang-Klingenberg planes*, Geom. Dedicata, **43**(1992), 93–107.
- [4] I. KRA, *On Teichmüller's theorem on the quasi-invariance of cross ratios*, Israel J. Math., **30**(1978), 152–158.
- [5] O. LEHTO, *Univalent Functions and Teichmüller Space*, Springer-Verlag, New York, 1987.
- [6] A. F. BEARDON, *The Geometry of Discrete Group*, Springer-Verlag, New York, 1983.
- [7] Z. M. BALOGH, *Hausdorff dimension distribution of quasiconformal mappings on the Heisenberg group*, J. Anal. Math., **83**(2001), 289–312.
- [8] D. SULLIVAN, *Quasiconformal homeomorphism and dynamics II: Structural stability implies hyperbolicity for Kleinian groups*, Acta Math., **155**(1985), 243–260.
- [9] A. KORÁNYI, H. M. RIEMANN, *Foundations for the theory of quasiconformal mappings on the Heisenberg group*, Adv. Math., **111**(1995), 1–87.
- [10] L. V. AHLFORS, *Quasiconformal reflection*, Acta Math., **109**(1963), 291–301.
- [11] F. W. GEHRING, *Uniform domain and the ubiquitous quasidisk*, Jber. Deutsch. Math.-Verein., **89**(1987), 88–103.
- [12] B. G. OSGOOD, *Univalence criteria in multiply-connected domains*, Trans. Amer. Math. Soc., **260**(1980), 459–473.
- [13] J. G. KRZYŻ, *Quasicircles and harmonic measure*, Ann. Acad. Sci. Fenn. Ser. A I Math., **12**(1987), 19–24.
- [14] Y. M. CHU, J. F. CHENG, *Quasidisks and modulus monotone domains*, Acta Math. Sinica, **39**(1996), 556–560 (In Chinese).
- [15] O. LEHTO, K. I. VIRTANEN, *Quasiconformal Mappings in the Plane*, Springer-Verlag, New York, 1973.
- [16] S. B. AGARD, F. W. GEHRING, *Angles and quasiconformal mappings*, Proc. London Math. Soc.,(3), **14a**(1965), 1–21.