

A SHORT NOTE ON HARMONIC FUNCTIONS ON SELF-SIMILAR STRUCTURES

BRIGITTE E. BRECKNER

Abstract. A sufficient condition is given concerning the harmonic structure on a post critically finite self-similar structure K that ensures that harmonic functions are not zero divisors in the algebra of real-valued continuous functions on K .

MSC 2010. 28A80, 49J52.

Key words. Self-similar structure, harmonic function, Sierpinski fractal.

REFERENCES

- [1] B.E. Breckner, *Real-valued functions of finite energy on the Sierpinski gasket*, Mathematica, (55) **78** (2013), 2, 142–158.
- [2] B.E. Breckner, *A short note on harmonic functions and zero divisors on the Sierpinski fractal*, Arch. Math. (Basel), **106** (2016), 183–188.
- [3] B.E. Breckner and R. Chill, *The Laplace operator on the Sierpinski gasket with Robin boundary conditions*, Nonlinear Anal. Real World Appl., **38** (2017), 245–260.
- [4] B.E. Breckner and Cs. Varga, *Multiple solutions of Dirichlet problems on the Sierpinski gasket*, J. Optim. Theory Appl., **167** (2015), 3, 842–861.
- [5] B.E. Breckner and Cs. Varga, *An application of a fixed-point theorem to Neumann problems on the Sierpinski fractal*, Fixed Point Theory, **19** (2018), 2, 475–486.
- [6] M. Galewski, *Multiple Solutions to a Dirichlet problem on the Sierpinski gasket*, Taiwanese J. Math., **20** (2016), 5, 1079–1092.
- [7] M. Galewski, *Optimization problems on the Sierpinski gasket*, Electron. J. Differential Equations, **2016**, 105, 1–11.
- [8] J. Kigami, *A harmonic calculus on the Sierpinski spaces*, Japan J. Appl. Math., **6** (1989), 259–290.
- [9] J. Kigami, *Harmonic calculus on p. c. f. self-similar sets*, Trans. Am. Math. Soc., **335** (1993), 721–755.
- [10] J. Kigami, *Analysis on Fractals*, Cambridge University Press, Cambridge, UK, 2001.
- [11] G. Molica Bisci and V. Rădulescu, *A characterization for elliptic problems on fractal sets*, Proc. Amer. Math. Soc., **143** (2015), 7, 2959–2968.
- [12] G. Molica Bisci, D. Repovš and R. Servadei, *Nonlinear problems on the Sierpinski gasket*, J. Math. Anal. Appl., **452** (2017), 2, 883–895.
- [13] R.S. Strichartz, *Differential Equations on Fractals. A Tutorial*, Princeton University Press, Princeton, NJ, 2006.

Received December 3, 2019

Accepted March 25, 2020

Babeş-Bolyai University
Faculty of Mathematics and Computer Science
Str. M. Kogălniceanu nr. 1
400084 Cluj-Napoca, Romania
E-mail: brigitte@math.ubbcluj.ro