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BOX–COUNTING DIMENSION OF OSCILLATORY SOLUTIONS TO THE EMDEN–FOWLER EQUATION

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Abstract. The box-counting dimension of graphs of oscillatory solutions to the Emden-Fowler equation is studied. The half-linear equation is also considered.

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REFERENCES

[1] F. V. ATKINSON, *On second-order non-linear oscillations*, Pacific J. Math. **5** (1955), 643–647.
[2] S. BELOHOREC, *Oscillatory solutions of certain nonlinear differential equations of second order*, Mat. Fyz. Cas. Slovensk. Akad. Vied. **11** (1961), 250–255.
[3] O. DOŠLÝ AND P. ŘEHÁK, *Half-linear differential equations*, North-Holland Mathematics Studies **202**, Elsevier Science B. V., Amsterdam, 2005.
[4] P. DRÁBEK AND R. MANÁSEVICH, *On the closed solution to some nonhomogeneous eigenvalue problems with p-Laplacian*, Differential Integral Equations **12** (1999), 773–788.
[5] K. FALCONER, *Fractal Geometry. Mathematical Fondations and Applications*, John Willey-Sons, 1999.
[6] I. T. KIGURADZE, *On the oscillatory and monotone solutions of ordinary differential equations*, Arch. Math. (Brno) **14** (1978), 21–44.
[7] I. T. KIGURADZE AND T. A. CHANTURIA, *Asymptotic properties of solutions of nonautonomous ordinary differential equations*, Translated from the 1985 Russian original, Mathematics and its Applications (Soviet Series) **89**, Kluwer Academic Publishers Group, Dordrecht, 1993.
[8] T. KUSANO AND M. NAITO, *Unbounded nonoscillatory solutions of nonlinear ordinary differential equations of arbitrary order*, Hiroshima Math. J. **18** (1988), 361–372.
[9] M. K. KWONG, M. PAŠIĆ AND J. S. W. WONG, *Rectifiable oscillations in second-order linear differential equations*, J. Differential Equations **245** (2008), 2333–2351.
[10] M. NAITO, *A remark on the existence of slowly growing positive solutions to second order superlinear ordinary differential equations*, No. DEA Nonlinear Differential Equations Appl. **20** (2013), 1759–1769.
[11] M. PAŠIĆ, *Fractal oscillations for a class of second order linear differential equations of Euler type*, J. Math. Anal. Appl. **341** (2008), 211–223.
[12] M. PAŠIĆ AND S. TANAKA, *Fractal oscillations of self-adjoint and damped linear differential equations of second-order*, Appl. Math. Comput. **218** (2011), 2281–2293.
[13] M. PAŠIĆ AND S. TANAKA, *Fractal oscillations of chirp functions and applications to second-order linear differential equations*, Int. J. Differ. Equ. **2013**, Art. ID 857410, 11 pp.
[14] M. PAŠIĆ AND J. S. W. WONG, *Rectifiable oscillations in second-order half-linear differential equations*, Ann. Mat. Pura Appl. (4) **188** (2009), 517–541.
[15] S. TAKEUCHI, *Multiple-angle formulas of generalized trigonometric functions with two parameters*, J. Math. Anal. Appl. **444** (2016), 1000–1014.
[16] C. TRICOT, *Curves and Fractal Dimension*, Springer-Verlag, New York, 1995.
[17] J. S. W. WONG, *On the generalized Emden-Fowler equation*, SIAM Rev. **17** (1975), 339–360.

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[18] J. S. W. WONG, *On rectifiable oscillation of Emden-Fowler equations*, Mem. Differential Equations Math. Phys. **42** (2007), 127–144.