

INFINITELY MANY SOLUTIONS FOR KIRCHHOFF TYPE PROBLEMS

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Abstract. This paper is devoted to the study of infinitely many solutions for a class of Kirchhoff type problems on a bounded domain. Based on the Fountain Theorem of Bartsch, we obtain the multiplicity results, which unify and sharply improve the recent results of He and Zou [X. He, W. Zou, Multiplicity of solutions for a class of Kirchhoff type problems, *Acta Math. Appl. Sin. (Engl. Ser.)* 26 (2010) 387–394].

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REFERENCES

- [1] C. O. ALVES, F. J. S. CORRÊA, T. F. MA, *Positive solutions for a quasilinear elliptic equation of Kirchhoff type*, *Comput. Math. Appl.*, **49** (2005), 85–93.
- [2] B. CHENG AND X. WU, *Existence results of positive solutions of Kirchhoff type problems*, *Nonlinear Anal.*, **71** (2009), 4883–4892.
- [3] X. HE, W. ZOU, *Infinitely many positive solutions for Kirchhoff-type problems*, *Nonlinear Anal.*, **70** (2009), 1407–1414.
- [4] X. HE, W. ZOU, *Multiplicity of solutions for a class of Kirchhoff type problems*, *Acta Math. Appl. Sin. (Engl. Ser.)*, **26** (2010), 387–394.
- [5] L. JEANJEAN, *On the existence of bounded Palais-Smale sequences and application to a Landesman-Lazer-type problem set on \mathbb{R}^N* , *Proc. Roy. Soc. Edinburgh Sect. A*, **129** (1999), 787–809.
- [6] R. KAJIKIYA, *A critical point theorem related to the symmetric mountain pass lemma and its applications to elliptic equations*, *J. Funct. Anal.*, **225** (2005), 352–370.
- [7] S. LIU, *On superlinear problems without the Ambrosetti and Rabinowitz condition*, *Nonlinear Anal.*, **73** (2010), 788–795.
- [8] T. F. MA, J. E. MUÑOZ RIVERA, *Positive solutions for a nonlinear nonlocal elliptic transmission problem*, *Appl. Math. Lett.*, **16** (2003), 243–248.
- [9] A. MAO, Z. ZHANG, *Sign-changing and multiple solutions of Kirchhoff type problems without the P.S. condition*, *Nonlinear Anal.*, **70** (2009), 1275–1287.
- [10] K. PERERA, Z. ZHANG, *Nontrivial solutions of Kirchhoff-type problems via the Yang index*, *J. Differential Equations*, **221** (2006), 246–255.
- [11] J.-J. SUN, C.-L. TANG, *Existence and multiplicity of solutions for Kirchhoff type equations*, *Nonlinear Anal.*, **74** (2011), 1212–1222.
- [12] M. WILLEM, *Minimax Theorems*, Birkhäuser, Boston, 1996.
- [13] K. YOSIDA, *Functional Analysis*, Springer-Verlag, Berlin, 1980.
- [14] Z. ZHANG, K. PERERA, *Sign changing solutions of Kirchhoff type problems via invariant sets of descent flow*, *J. Math. Anal. Appl.*, **317** (2006), 456–463.