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EXISTENCE OF TWO SOLUTIONS FOR A NAVIER BOUNDARY VALUE PROBLEM INVOLVING THE p–BIHARMONIC

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Abstract. In this paper, we study the Navier boundary value problem involving the p-biharmonic system with sign-changing weight function. By using the Nehari manifold and variational methods, the existence of two nontrivial solutions is obtained when the pair of the parameters (λ, μ) belongs to a certain subset of $\mathbb{R}^2$.

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REFERENCES

[1] A. R. EL AMROUSS, S. EL HABIB, N. TSOULI, *Existence of solutions for an eigenvale problem with weight*, Electron. J. Differential Equations, **45** (2010), 1–10.
[2] H. BRÉZIS, E. LIEB, *A relation between pointwise convergence of functions and convergence of functionals*, Proc. Amer. Math. Soc., **88** (1983), 486–490.
[3] K. J. BROWN, T. F. WU, *A semilinear elliptic system involving nonlinear boundary condition and sign-changing weight function*, J. Math. Anal. Appl., **337** (2008), 1326–1336.
[4] K. J. BROWN, Y. ZHANG, *The Nehari manifold for a semilinear elliptic equation with a sign-changing weight function*, J. Differential Equations, **193** (2003), 481–499.
[5] P. C. CARRIÃO , L. F. O. FARIA, O. H. MIYAGAKI, *A biharmonic elliptic problem with dependence on the gradient and the Laplacian*, Electron. J. Differential Equations, **93** (2009), 1–12.
[6] C. M. CHU, C. L. TANG, *Existence and multiplicity of positive solutions for semilinear elliptic systems with Sobolev critical exponents*, Nonlinear Anal., **71** (2009), 5118–5130.
[7] P. DRÁBEK, M. ÔTANI, *Global bifurcation result for the p-biharmonic operator*, Electronic J. of Differential Equations, **48** (2001), 1–19.
[8] P. DRÁBEK, S.I. POHOZAEV, *Positive solutions for the p-Laplacian: Application of the fibering method*, Proc. Roy. Soc. Edinburgh Sect. A, **127** (1997), 703–727.
[9] X. F. KE, C. L. TANG, *Existence of solutions for a class of noncooperative elliptic systems*, J. Math. Anal. Appl., **370** (2010), 18–29.
[10] A. EL KHALIL, S. KELLATI, A. TOUZANI, *On the spectrum of the p-Biharmonic Operator*, Proceedings of the 2002 Fez Conference on Partial Differential Equations, Electron. J. Differ. Equ. Conf., **9** (2002), 161–170.
[11] C. LI, C. L. TANG, *Three solutions for a Navier boundary value problem involving the p-biharmonic*, Nonlinear Anal., **72** (2010), 1339–1347.
[12] L. LI , C. L. TANG, *Existence of three solutions for (p,q)-biharmonic systems*, Nonlinear Anal., **73** (2010), 796–805.
[13] M. TALBI, N. TSOULI, *Existence and uniqueness of a positive solution for a non homogeneous problem of fourth order with weight*, Proceedings of the 2005 Oujda International Conference on Nonlinear Analysis, Electron. J. Differ. Equ. Conf., **14** (2006), 231–240.
[14] M. TALBI, N. TSOULI, *On the spectrum of the weighted p-biharmonic operator with weight*, Mediterr. J. Math., **4** (2007), 73–86.
[15] M. WILLEM, *Minimax Theorems*, Birkhäuser, Boston, 1996.

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[16] T. F. WU, *On semilinear elliptic equations involving concave-convex nonlinearities and sign-changing weight function*, J. Math. Anal. Appl., **318** (2006), 253–270.