Existence result for nonuniformly degenerate semilinear elliptic systems in R^N

Chung N.T., Toan H.Q.

Department of Mathematics and Informatics, Quang Binh University, 312 Ly Thuong Kiet, Dong Hoi, Viet Nam; Department of Mathematics, Hanoi University of Science, 334 Nguyen Trai, Hanoi, Viet Nam

Abstract: We study the existence of solutions for a class of nonuniformly degenerate elliptic systems in R^N, ?N 3, of the form -div(h $_1$(x)??u) + a(x)u = f(x,u,v) inR^N -div(h $_2$(x)?? v) + b(x)v = g(x,u,v) inR^N where hi ??$L^1_{loc}(R^N)$, hi(x) ? ??0|x| $^?$ with ? ??(0, 2) and ??0 > 0, i = 1, 2. The proofs rely essentially on a variant of the Mountain pass theorem (D. M. Duc, Nonlinear singular elliptic equations, J. Lond. Math. Soc. 40(2) (1989), 420-440) combined with the Caffarelli-Kohn-Nirenberg inequality (First order interpolation inequalities with weights, Composito Math. 53 (1984), 259275). ?? 2009 Glasgow Mathematical Journal Trust.

Year: 2009
Source title: Glasgow Mathematical Journal
Volume: 51
Issue: 3
Page : 561-570
Link: Scorpus Link
Correspondence Address: Chung, N. T.; Department of Mathematics and Informatics, Quang Binh University, 312 Ly Thuong Kiet, Dong Hoi, Viet Nam; email: ntchung82@yahoo.com
ISSN: 170895
DOI: 10.1017/S0017089509005175
Language of Original Document: English
Abbreviated Source Title: Glasgow Mathematical Journal
Document Type: Article
Source: Scopus
Authors with affiliations:

1. Chung, N.T., Department of Mathematics and Informatics, Quang Binh University, 312 Ly Thuong Kiet, Dong Hoi, Viet Nam
2. Toan, H.Q., Department of Mathematics, Hanoi University of Science, 334 Nguyen Trai, Hanoi, Viet Nam

References:

1. Ambrosetti, A., Rabinowitz, P.H., Dual variational methods in critical points theory and applications (1973) J. Funct. Anal., 4, pp. 349-381
2. Brezis, H., (1992) Analyse Fonctionelle Th?eorie et Applications, , Masson
3. Caffarelli, L., Kohn, R., Nirenberg, L., First order interpolation inequalities with weights (1984) Composito Math., 53, pp. 259-275
4. Caldiroli, P., Musina, R., On the existence of extremal functions for a weighted Sobolev embedding with critical exponent (1999) Calc. Var. Partial Differential Equations, 8 (4), pp. 365-387

5. Catrina, F., Wang, Z.Q., On the Caffarelli-Kohn-Nirenberg inequalities: Sharp constants, existence (and nonexistence) and symmetry of extremal functions (2001) Comm. Pure Appl. Math., 54, pp. 229-258
6. Chung, N.T., Existence of weak solutions for a nonuniformly elliptic nonlinear system inRN (2008) EJDE, 119, pp. 1-10
7. Costa, D.G., On a class of elliptic systems in?N (1994) EJDE, 7, pp. 1-14
8. Duc, D.M., Nonlinear singular elliptic equations (1989) J. Lond. Math. Soc., 40 (2), pp. 420-440
9. Gazzola, F., Radulescu, V., A nonsmooth critical point theory approach to some nonlinear elliptic equations in?N (2000) Differential Integr. Equations, 13 (1-3), pp. 47-60
10. Mi??ailescu, M., Nonlinear eigenvalue problems for some degenerate elliptic operators on?N (2005) Bull. Belg. Math. Soc., 12, pp. 435-448
11. Mi??ailescu, M., Existence and multiplicity of weak solutions for a class of denegerate nonlinear elliptic equations (2006) Boundary Value Probl., p. 17. , Art. ID 41295
12. Mi??ailescu, M., ?adulescu, V., Ground state solutions of nonlinear singular Schr??odinger equations with lack of compactness (2003) Math. Methods Appl. Sci., 26, pp. 897-906
13. Motreanu, D., ?adulescu, V., Eigenvalue problems for degenerate nonlinear elliptic equations in anisotropic media (2005) Boundary Value Probl., 2, pp. 107-127
14. Radulescu, V., Smets, D., Critical singular problems on infinite cones (2003) Nonlinear Anal., 54 (6), pp. 1153-1164