Existence of weak solutions for a class of nonuniformly nonlinear elliptic equations in unbounded domains

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Abstract: The goal of this paper is to study the existence of non-trivial weak solutions for the nonuniformly nonlinear elliptic equation - div (h (x) u) + q (x) u = f (x, u) in an unbounded domain Ω R^N (N ≥ 3), where h (x) L_{loc}^1 (Ω). The solutions will be obtained in a subspace of the Sobolev space H_0^1 (Ω) and the proofs rely essentially on a variation of the Mountain pass theorem in [D.M. Duc, Nonlinear singular elliptic equations, J. London. Math. Soc. 40 (2) (1989) 420-440].

Author Keywords: Mountain pass theorem; Nonuniformly elliptic equations; The weakly continuously differentiable functional

Index Keywords: Landforms; Navier Stokes equations; Existence of weak solutions; Mountain pass theorem; Non-linear elliptic equations; Non-trivial; Nonuniformly elliptic equations; Singular elliptic equations; Sobolev spaces; The weakly continuously differentiable functional; Unbounded domains; Weak solutions; Nonlinear equations

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References:

- Abakhti-Mchachti, A., Fleckinger-Pellé, J., Existence of positive solutions for non-cooperative semilinear elliptic systems defined on an unbounded domain (1992) Pitman Research Notes in Maths., 266, pp. 92-106

- Costa, D.G., On a class of elliptic systems in Rn (1994) Electron. J. Differential Equations, 7, pp. 1-14
- Duc, D.M., Nonlinear singular elliptic equations (1989) J. London. Math. Soc., 40 (2), pp. 420-440
- Mihăilescu, M., Existence and multiplicity of weak solutions for a class of degenerate nonlinear elliptic equations (2006) Boud. Value Probl., Art.ID 41295, pp. 1-17
- Struwe, M., (2000) Variational Methods. second ed., , Springer-Verlag
- Vu, N.T., Duc, D.M., Nonuniformly elliptic equations of p-Laplacian type (2005) Nonlinear Anal., 61, pp. 1483-1495