

## POSITIVE SOLUTIONS FOR INFINITE SEMIPOSITONE/ POSITONE QUASILINEAR ELLIPTIC SYSTEMS WITH SINGULAR AND SUPERLINEAR TERMS

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*Abstract.* We establish existence and regularity of positive solutions for a class of quasilinear elliptic systems with singular and superlinear terms. The approach is based on sub-supersolution methods for systems of quasilinear singular equations and the Schauder's fixed point theorem.

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### REFERENCES

- [1] C. O. ALVES, F. J. S. A. CORRÊA, *On the existence of positive solution for a class of singular systems involving quasilinear operators*, Appl. Math. Comput., **185** (2007), 727–736.
- [2] C. O. ALVES, F. J. S. A. CORRÊA, J. V. A. GONÇALVES, *Existence of solutions for some classes of singular Hamiltonian systems*, Adv. Nonlinear Stud., **5** (2005), 265–278.
- [3] H. BRÉZIS, *Analyse fonctionnelle, théorie et applications*, Masson, Paris, 1983.
- [4] S. CARL, V. K. LE, D. MOTREANU, *Nonsmooth variational problems and their inequalities. Comparison principles and applications*, Springer, New York, 2007.
- [5] S. EL MANOUNI, K. PERERA, R. SHIVAJI, *On singular quasimonotone  $(p,q)$ -Laplacian systems*, Proc. Roy. Soc. Edinburgh Sect. A, **142** (2012), 585–594.
- [6] M. GHERGU, *Lane-Emden systems with negative exponents*, J. Functional Anal., **258** (2010), 3295–3318.
- [7] M. GHERGU, *Lane-Emden systems with singular data*, Proc. Royal Society of Edinburgh: Section A (Math.) **141** (2011), 1279–1294.
- [8] J. GIACOMONI, J. HERNANDEZ, A. MOUSSAOUI, *Quasilinear and singular systems: the cooperative case*, Contemporary Math., Amer. Math. Soc., Providence, R.I., **540** (2011), 79–94.
- [9] J. GIACOMONI, J. HERNANDEZ, P. SAUVY, *Quasilinear and singular elliptic systems*, Adv. Nonl. Anal., **2** (2013), 1–41.
- [10] J. GIACOMONI, I. SCHINDLER, P. TAKAC, *Sobolev versus Hölder local minimizers and existence of multiple solutions for a singular quasilinear equation*, Ann. Sc. Norm. Super. Pisa Cl. Sci., **5**, 6 (2007), 117–158.
- [11] D. D. HAI, *On a class of singular  $p$ -Laplacian boundary value problems*, J. Math. Anal. Appl., **383** (2011), 619–626.
- [12] J. HERNÁNDEZ, F. J. MANCEBO, J. M. VEGA, *Positive solutions for singular semilinear elliptic systems*, Adv. Diff. Eqts., **13** (2008), 857–880.
- [13] E. K. LEE, R. SHIVAJI, J. YE, *Classes of singular  $pq$ -Laplacian semipositone systems*, Disc. Contin. Dynam. Syst. A, **27** (2010), 1123–1132.
- [14] E. K. LEE, R. SHIVAJI, J. YE, *Classes of infinite semipositone systems*, Diff. Integral Eqts., **24** (2011), 361–370.
- [15] M. MONTENEGRO, A. SUAREZ, *Existence of a positive solution for a singular system*, Proc. Roy. Soc. Edinburgh Sect. A, **140** (2010), 435–447.

- [16] D. MOTREANU, V. V. MOTREANU, N. PAPAGEORGIOU, *Multiple constant sign and nodal solutions for nonlinear Neumann eigenvalue problems*, *Ann. Sc. Norm. Super. Pisa Cl. Sci.*, **5**, 10 (2011), 729–755.
- [17] D. MOTREANU, A. MOUSSAOUI, *A quasilinear singular elliptic system without cooperative structure*, *Act. Math. Sci.*, **34 B**, 3 (2014), 905–916.
- [18] D. MOTREANU, A. MOUSSAOUI, *Existence and boundedness of solutions for a singular cooperative quasilinear elliptic system*, *Complex Var. Elliptic Equ.*, **59** (2014), 285–296.
- [19] D. MOTREANU, A. MOUSSAOUI, *An existence result for a class of quasilinear singular competitive elliptic systems*, *Applied Math. Letters*, **38** (2014), 33–37.
- [20] A. MOUSSAOUI, B. KHODJA, S. TAS, *A singular Gierer-Meinhardt system of elliptic equations in  $R^N$* , *Nonl. Anal.*, **71** (2009), 708–716.
- [21] H. YIN, Z. YANG, *Existence and non-existence of entire positive solutions for quasilinear systems with singular and super-linear terms*, *Differ. Equ. Appl.*, **2**, 2 (2010), 241–249.
- [22] E. ZEIDLER, *Nonlinear functional analysis and its applications. I. Fixed-point theorems*, Springer-Verlag, New York, 1986.