

## SOLUTIONS FOR SINGULAR ELLIPTIC SYSTEMS INVOLVING HARDY-SOBOLEV CRITICAL NONLINEARITY

LING DING AND SHI-WU XIAO

*Abstract.* In this paper, we deal with a class of singular elliptic system with Hardy-Sobolev critical nonlinearity. The existence and multiplicity of solutions for this system are obtained by the variational methods and some analysis techniques.

*Mathematics subject classification (2010):* 35J60, 35J20, 35B33.

*Keywords and phrases:* elliptic systems, Hardy terms, critical Hardy-Sobolev exponents.

### REFERENCES

- [1] C. O. ALVES AND D. G. DE FIGUEIREDO, *Nonvariational elliptic systems*, Discr. Contin. Dyn. Syst., **8** (2002), 289–302.
- [2] C. O. ALVES, D. C. DE MORAIS FILHO AND M. A. S. SOUTO, *On systems of elliptic equations involving subcritical or critical Sobolev exponents*, Nonlinear Anal., **42** (2000), 771–787.
- [3] H. BREZIS AND L. NIRENBERG, *Positive solutions of nonlinear elliptic equations involving critical Sobolev exponents*, Comm. Pure Appl. Math., **36** (1983), 437–477.
- [4] N. GHOUSSOUB AND C. YUAN, *Multiple solutions for quasi-linear PDEs involving the critical Sobolev and Hardy exponents*, Trans. Amer. Math. Soc., **352** (2000), 5703–5743.
- [5] P. G. HAN, *High-energy positive solutions for a critical growth Dirichlet problem in noncontractible domains*, Nonlinear Anal., **60** (2005), 369–387.
- [6] P. G. HAN, *The effect of the domain topology on the number of positive solutions of an elliptic system involving critical Sobolev exponents*, Houston J. Math., **32** (2006), 1241–1257.
- [7] P. G. HAN, *Strongly indefinite systems with critical Sobolev exponents and weights*, Appl. Math. Lett., **17** (2004), 909–917.
- [8] D. S. KANG AND S. J. PENG, *Positive solutions for singular critical elliptic problems*, Appl. Math. Lett., **17** (2004), 411–416.
- [9] Z. X. LIU AND P. G. HAN, *Existence of solutions for singular elliptic systems with critical exponents*, Nonlinear Anal., **69** (2008), 2968–2983.
- [10] Y. LOU, *Necessary and sufficient condition for the existence of positive solutions of certain cooperative system*, Nonlinear Anal., **26** (1996), 1079–1095.
- [11] P. H. RABINOWITZ, *Minimax methods in critical point theory with applications to differential equations*, CBMS Reg. Conf. Series . Math., **65**, Amer. Math. Soc., Providence, RI, 1986.
- [12] P. H. ZHAO AND X. Y. WANG, *The existence of positive solutions of elliptic system by a linking theorem on product space*, Nonlinear Anal., **56** (2004), 227–240.