Liouville type theorems for a class of non-cooperative elliptic systems

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I will report on joint work with Norman Dancer, Hugo Tavares, Susanna Terracini and Gianmaria Verzini. For a class of semilinear elliptic systems with homogeneous gradient type nonlinearity, we study the question of existence and nonexistence of nontrivial nonnegative solutions on the entire space and for the corresponding half space Dirichlet problem. Our results imply—for certain parameter values—a priori bounds for more general boundary value problems which we also discuss. Our study includes weakly coupled Schrödinger systems which have attracted great interest in recent years due to their appearance in nonlinear optics and in models for multi-component mixtures of Bose-Einstein condensates. In some cases, we identify optimal parameter ranges for which a priori bounds hold. The key difference to classical results is that the systems we consider are non-cooperative.

References

[1] *E. N. Dancer, T. Weth*: Liouville type results for noncooperative elliptic systems in a half space. J. Lond. Math. Soc. (2) *86* (2012), 111–128.

[2] *H. Tavares, S. Terracini, G. Verzini, T. Weth*: Existence and nonexistence of entire solutions for non-cooperative elliptic systems. Commun. Partial Differ. Equations *36* (2011), 1988–2010.