

On (p, N) problems with critical exponential nonlinearities

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Abstract: In the first part of the talk, we present some recent results for equations in \mathbb{R}^N driven by (p, N) elliptic operators of Marcellini's type and involving critical Trudinger–Moser nonlinearities with exponential growth. The equations are variational and present several difficulties due to the double structure of the elliptic part combined with the lack of compactness at critical level. In order to state a multiplicity result, we introduce a tricky step analysis based on the application of a completely new Brézis and Lieb type lemma for exponential nonlinearities.

In the second part of the talk, we present a nontrivial generalization of the (p, N) equations into a vectorial system, with a coupled exponential nonlinearity. This situation forces more restrictive assumptions on the coupled exponential term than the related scalar counterpart. In particular, we introduce conditions which allow us to prove that both components of the vectorial solutions are nontrivial and different. That is, the system does not reduce into an equation.

All results of the talk are obtained in the papers [1, 2, 3].

REFERENCES

- [1] S. CHEN, A. FISCELLA, P. PUCCI AND X. TANG, *Coupled elliptic systems in \mathbb{R}^N with (p, N) Laplacian and critical exponential nonlinearities*, submitted for publication p. 14.
- [2] A. FISCELLA AND P. PUCCI, *Entire solutions for (p, N) systems with coupled critical exponential nonlinearities*, submitted for publication p. 17.
- [3] A. FISCELLA AND P. PUCCI, *(p, N) equations with critical exponential nonlinearities in \mathbb{R}^N* , J. Math. Anal. Appl. p. 22, Special Issue New Developments in *Nonuniformly Elliptic and Nonstandard Growth Problems*, DOI: <https://doi.org/10.1016/j.jmaa.2019.123379>