Nonvariational system with variable exponents, nonexistence of solutions and existence via blow-up

Raul Manasevich

Universidad de Chile (UChile), Chile

We consider the problem of nonexistence and existence of positive radial solutions for some systems of nonlinear partial differential equations containing variable exponents .. The study of the existence of positive radial solutions for scalar equations containing variable exponents has received some attention in the last years by using variational methods. Here we deal with non-variational systems and therefore variational methods do not apply. To prove existence of positive solution we use the blow up method combined with nonexistence results to obtain a-priori bounds of the solutions, and then we use topological degree methods. In this sense an interesting situation arises, indeed , when the blow up method is applied to our system with variable exponents one obtains a limit system which does not contain variable exponents and hence one can apply nonexistence results for this limiting system that already in the literature. In spite of these facts we derive in this paper nonexistence results, i.e. Liouville type of theorems, for systems of differential equations containing variable exponents, since it is a problem interesting in its own.

In Special Session 28 on Recent Trends in Nonlinear Elliptic PDEs at the Mathematical Congress of the Americas 2025.

MCA 2025 internal code: SS28-T21