

Positive Solutions for Systems of Quasilinear Equations with Non-homogeneous Operators and Weights

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Abstract

In this paper we deal with positive radially symmetric solutions for a boundary value problem containing a strongly nonlinear operator. The proof of existence of positive solutions that we give uses the blow-up method as a main ingredient for the search of a-priori bounds of solutions. The blow-up argument is one by contradiction and uses a sort of scaling, reminiscent to the one used in the theory of minimal surfaces, see [12], and therefore the homogeneity of the operators, Laplacian or p-Laplacian, and second members powers or power like functions play a fundamental role in the method. Thus, when the differential operators are no longer homogeneous, and similarly for the second members, applying the blow-up method to obtain a-priori bounds of solutions seems an almost impossible task. In spite of this fact, in [8], we were able to overcome this difficulty and obtain a-priori bounds for a certain (simpler) type of problems. We show in this paper that the asymptotically homogeneous functions provide, in the same sense, a nonlinear rescaling, that allows us to generalize the blow-up method to our present situation. After the a-priori bounds are obtained, the existence of a solution follows from Leray-Schauder topological degree theory.

Keywords

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