Normalized solutions to the Born-Infeld problem and a class of $(2, q)$-Laplacian equations

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Abstract

In this talk, we will disclose the main results contained in a recent paper written jointly with Jarosław Mederski (Institute of Mathematics Polish Academy of Sciences, Warsaw) and Alessio Pomponio (Polytechnic University of Bari, Italy).

Motivated by the fact that physicists are often interested in normalized solutions, we will discuss some recent results concerning existence and nonexistence of normalized solutions to a large class of quasilinear problems, including the well-known Born-Infeld operator.

Our main theorems cover the mass subcritical, critical, and supercritical cases, in the sense of the critical exponents $2(1 + 2/N)$, $q(1 + 2/N)$. In the mass subcritical cases, we study a global minimization problem and obtain a ground state solution for a $(2, q)$-type operator which implies the existence of solutions to the Born-Infeld problem. We also deal with the mass supercritical cases, getting an existence result by a mountain pass approach, while in the critical cases, we prove nonexistence results by using asymptotic decays of particular externals, for quasilinear problems involving the $(2, q)$-type operator.