

Quasilinear elliptic Dirichlet problem with gradient dependence

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In this talk we study a nonlinear Dirichlet problem driven by a (p, q) -Laplacian operator containing a parameter $\mu > 0$ and a nonlinear term depending on the solution and its gradient

$$\begin{cases} -\Delta_p u - \mu \Delta_q u = f(x, u, \nabla u) & \text{in } \Omega, \\ u = 0 & \text{on } \partial\Omega. \end{cases}$$

Existence of solutions, asymptotic property as $\mu \rightarrow +\infty$ and $\mu \rightarrow 0$ are established under a suitable growth conditions. Moreover improving the growth condition we obtain a result for existence of positive solutions. The results of existence and asymptotic properties of solutions are obtained by using the theory of pseudomonotone operators, while for location of solutions we use the method of sub-solution and super-solution for quasilinear elliptic equations combined with comparison arguments.

These results have been obtained in collaboration with Prof. D. Averna and Prof. D. Motreanu.

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References

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