

ANALYSIS SEMINAR

On a class of quasilinear equations involving critical exponent and nonlinearity concave at the origin

Ricardo Ruviano

UnB

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Abstract. Firstly, we are interested in proving some results of existence, multiplicity and regularity for quasilinear problems of the type

$$\begin{cases} -\Delta u - u\Delta(u^2) = -\lambda|u|^{q-2}u + \mu u + (u^+)^{p-1}, & \text{in } \Omega, \\ u = 0, & \text{on } \partial\Omega, \end{cases} \quad (P)$$

where $\Omega \subset \mathbb{R}^N$ is a bounded domain with regular boundary $\partial\Omega$, $N \geq 1$, $\lambda, \mu > 0$, $1 < q < 2$ and $4 < p < 22^* = 4N/(N-2)$ if $N \geq 3$ or $p > 4$ if $N = 1$ or $N = 2$.

Secondly, we will consider the class of quasilinear problems as follows

$$\begin{cases} -\Delta u - u\Delta(u^2) = -\lambda|u|^{q-2}u + |u|^{22^*-2}u + \mu g(x, u), & \text{in } \Omega, \\ u = 0, & \text{on } \partial\Omega, \end{cases} \quad (Q)$$

where $\Omega \subset \mathbb{R}^N$ is a bounded domain with regular boundary $\partial\Omega$, $N \geq 3$, $\lambda, \mu > 0$, $1 < q < 4$, $22^* := 4N/(N-2)$ and the C^1 function g has a subcritical growth and possesses a condition of monotonicity.

References

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