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Quasilinear elliptic problems using variational methods

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In this talk we consider the following class of quasilinear coupled systems

$$\begin{cases} -\Delta u + a(x)u - \Delta(u^2)u = g(u) + \theta\alpha\lambda(x)|u|^{\alpha-2}u|v|^{\beta}, & x \in \mathbb{R}^N, \\ -\Delta v + b(x)v - \Delta(v^2)v = h(v) + \theta\beta\lambda(x)|v|^{\beta-2}v|u|^{\alpha}, & x \in \mathbb{R}^N, \end{cases} \tag{0.1}$$

where $N \geq 3$ and $a, b : \mathbb{R}^N \to \mathbb{R}$ are positive potentials, $\lambda : \mathbb{R}^N \to \mathbb{R}$ is a nonnegative continuous function, $\theta > 0$ and $\alpha, \beta > 2$ satisfying $\alpha + \beta < 2.2^*$. On the nonlinear terms we assume that g, h are in C^1 class which are superlinear functions at infinity and at the origin.

The main objective in the present work is to establish existence of ground state solutions for the elliptic problem (0.1) assuming that g and h have subcritical or critical growth. In the critical case we have another difficulty due the lack of compactness of the Sobolev spaces into the Lebesgue space $L^{2^*}(\mathbb{R}^N)$ with $2^* = 2N/(N-2), N \geq 3$.

Joint work with Maxwell Lizete Silva (UFG), José Carlos de Albuquerque (UFPE).

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