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SOLUTIONS FOR QUASILINEAR ELLIPTIC SYSTEMS WITH VANISHING POTENTIALS

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ABSTRACT. In this paper, we study the following strongly coupled quasilinear elliptic system:

$$\begin{cases} -\Delta_p u + \lambda a(x)|u|^{p-2}u = \frac{\alpha}{\alpha + \beta}|u|^{\alpha-2}u|v|^\beta, & x \in \mathbb{R}^N, \\ -\Delta_p v + \lambda b(x)|v|^{p-2}v = \frac{\beta}{\alpha + \beta}|u|^\alpha|v|^{\beta-2}v, & x \in \mathbb{R}^N, \\ u, v \in D^{1,p}(\mathbb{R}^N), \end{cases}$$

where $N \geq 3$, $\lambda > 0$ is a parameter, $p < \alpha + \beta < p^* := Np/(N - p)$. Under some suitable conditions which are given in section 1, we use variational methods to obtain both the existence and multiplicity of solutions for the system on an appropriated space when the parameter λ is sufficiently large. Moreover, we study the asymptotic behavior of these solutions when $\lambda \rightarrow \infty$.

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