In this talk we study the existence of positive solutions for the following class of \((p, q)\)-Laplacian coupled systems

\[
\begin{align*}
\begin{cases}
-\Delta_p u + a(x)|u|^{p-2}u = f(u) + \alpha \lambda(x)|u|^\alpha u^\beta, & x \in \mathbb{R}^N, \\
-\Delta_q v + b(x)|v|^{q-2}v = g(v) + \beta \lambda(x)|v|^\beta v^\alpha, & x \in \mathbb{R}^N,
\end{cases}
\end{align*}
\]

where \(N \geq 3\) and \(1 \leq p \leq q < N\). Here the coefficient \(\lambda(x)\) of the coupling term is related with the potentials by the condition \(|\lambda(x)| \leq \delta a(x)^{\alpha/p} b(x)^{\beta/q}\) where \(\delta \in (0, 1)\) and \(\alpha/p + \beta/q = 1\). The nonlinear terms \(f(s)\), \(g(s)\) are “superlinear” at 0 and at \(\infty\) and are assumed without the well known Ambrosetti-Rabinowitz condition at infinity. Thus, we have established the existence of positive ground states solutions for a large class of nonlinear terms and potentials. Our approach is variational and based on minimization technique over the Nehari manifold.

\(^1\text{This is a joint work with Edcarlos D. Domingos - UFG and J.M. do Ó - UFPB}\)