**Existence and nonexistence of ground state solutions for quasilinear elliptic Schrödinger coupled systems with asymptotically periodic potentials**

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Abstract

In this work we are concerned with the existence and nonexistence of ground state solutions for the following class of quasilinear Schrödinger coupled systems

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\begin{align*}
    -\Delta u + a(x)u - \Delta(u^2)u &= g(u) + \theta\lambda(x)uw^2, \quad x \in \mathbb{R}^N, \\
    -\Delta v + b(x)v - \Delta(v^2)v &= h(v) + \theta\lambda(x)vu^2, \quad x \in \mathbb{R}^N,
\end{align*}
\]

where \( N \geq 3, \theta \geq 0, a, b, \lambda : \mathbb{R}^N \to \mathbb{R} \) are asymptotically periodic functions. The nonlinear terms \( g, h \) are superlinear at infinity and at the origin. By using a change of variable, we turn the quasilinear system into a nonlinear system where we can establish a variational approach with a fine analysis on the Nehari method. For the nonexistence result we compare the potentials \( a(x), b(x) \) with periodic potentials proving nonexistence of ground state solutions.

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