

NEHARI MANIFOLD METHOD APPLIED TO A HAMILTONIAN SYSTEM

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The aim of our talk is to investigate with the Nehari manifold method the existence of solutions to the problem

$$\begin{cases} -\Delta u = \lambda v + |u|^{p-2}u & \text{in } \Omega, \\ -\Delta v = \lambda u - |v|^{q-2}v & \text{in } \Omega, \\ u, v = 0 & \text{on } \partial\Omega, \end{cases} \quad (0.1)$$

where $\lambda > 0$ is a parameter, $2 < q < p < 2^*$, where 2^* is the critical Sobolev exponent, Δ is the Laplacian operator and $\Omega \subset \mathbb{R}^N$ is a bounded regular domain. Let $H_0^1(\Omega)$ denote the standard Sobolev space and $\Phi_\lambda : H_0^1(\Omega) \times H_0^1(\Omega) \rightarrow \mathbb{R}$ the energy functional associated with (0.1), that is

$$\Phi_\lambda(u, v) = \frac{1}{2} \int |\nabla u|^2 + |\nabla v|^2 - \lambda \int uv + \frac{1}{q} \int |v|^q - \frac{1}{p} \int |u|^p. \quad (0.2)$$