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Introduction to the Nehari manifold method applied to a problem with non-linearity indefinite

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

$$\begin{cases} -\Delta_p u = \lambda |u|^{p-2}u + f|u|^{\gamma-2}u \text{ in } \Omega, \\ u = 0 \quad \text{on } \partial\Omega, \end{cases} \tag{0.1}$$

and using the generalized Rayleigh quotient, we introduce the following extreme value

$$\lambda^* = \inf \left\{ \frac{\int_\Omega |\nabla u|^p dx}{\int_\Omega |u|^p dx} : \int_\Omega f|u|^\gamma dx \geq 0, u \in W_0^{1,p}(\Omega) \right\}. \tag{0.2}$$

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