

Sign-changing solutions for quasilinear elliptic equations with Neumann boundary conditions

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We present some existence results for the following quasilinear elliptic equation with Neumann boundary condition

$$(1) \quad \begin{cases} -\Delta_p u = \lambda |u|^{p-2} u - f(x, u) & \text{in } \Omega, \\ \frac{\partial u}{\partial n} = 0 & \text{on } \partial\Omega, \end{cases}$$

We provide verifiable hypotheses on the nonlinearity $f(x, u)$ ensuring the existence of at least three nontrivial solutions of problem (1) provided the parameter λ is sufficiently large. Moreover, we are able to give precise information on their sign: a positive solution, a negative solution, and a nodal solution between the opposite constant sign solutions.