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Semilinear elliptic problems with nonlinearities depending on the derivative

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Abstract: We deal with the boundary value problem

$$\begin{aligned} -\Delta u(x) &= \lambda_1 u(x) + g(\nabla u(x)) + h(x), \quad && x \in \Omega \\ u(x) &= 0, && x \in \partial\Omega \end{aligned}$$

where $\Omega \subset \mathbb{R}^N$ is an smooth bounded domain, λ_1 is the first eigenvalue of the Laplace operator with homogeneous Dirichlet boundary conditions on Ω, $h \in L^{\max\{2,N/2\}}(\Omega)$ and $g : \mathbb{R}^N \longrightarrow \mathbb{R}$ is bounded and continuous. Bifurcation theory is used as the right framework to show the existence of solution provided that g satisfies certain conditions on the origin and at infinity.

Keywords: nonlinear boundary value problems, elliptic partial differential equations, bifurcation, resonace
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