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Two sequences of solutions for indefinite superlinear-sublinear elliptic equation involving nonlinear Neumann boundary condition

Stăncuţ Ionela-Loredana

University of Craiova

stancutloredana@yahoo.com

Abstract: We study the existence of infinitely many solutions of a nonlinear Neumann problem of the following type:

$$-\mathrm{div}(|\nabla u|^{m(x)-2}\nabla u) + |u|^{m(x)-2}u = f(x,u) \text{ in } \Omega, \quad |\nabla u|^{m(x)-2}\frac{\partial u}{\partial \nu} = g(x,u) \text{ on } \partial\Omega,$$

where Ω is a bounded domain in $\mathbb{R}^N$ with smooth boundary $\partial\Omega$, the functions $f(x,u)$ and $g(x,u)$ are continuous on $\overline{\Omega}\times\mathbb{R}$ and on $\partial\Omega\times\mathbb{R}$, respectively, and odd with respect to u, while m is a Lipschitz continuous function. More specifically, we study the existence of a sequence of solutions diverging to infinity provided that the nonlinear term is locally superlinear and the existence of a sequence of solutions converging to zero provided that the nonlinear term is locally sublinear.