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Multiplicity of Periodic Solutions for $2\,n^{\text{th}}$-order p-Laplacian Differential Equations

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This is a joint work with Dr. L. Saavedra. We study the existence and multiplicity of weak and classic solutions for a $2\,n^{\text{th}}-$order differential equation involving the $p-$Laplacian

$$\left(\varphi_p\left(u^{(n)}(t)\right)\right)^{(n)}+\sum_{i=1}^{n-1}(-1)^i a_i\left(\varphi_p\left(u^{(n-i)}(t)\right)\right)^{(n-i)} +(-1)^n\left(f(t,u(t))-h(t,u(t))=0\,,\ t\in[0,T]\right. \tag{1}$$

coupled with the periodic boundary conditions

$$u(T)-u(0)=\cdots=u^{(2\,n-1)}(T)-u^{(2\,n-1)}(0)=0\,, \tag{2}$$

where $T\geq 0$ and $a_i\geq 0$ for $i=1,\ldots,n-1$.. The results are proved by using the minimization argument and an extended Clark's theorem. The second-order equations are considered in [1]. The results are published in [2].

References

[1] P. Drábek, M. Langerová, S. Tersian, Existence and multiplicity of periodic solutions to one-dimensional p-Laplacian, Electronic Journal of Qualitative Theory of Differential Equations, 30 (2016) 1–9.

[2] L. Saavedra, S. Tersian, Existence of solutions for 2nd-order nonlinear p-Laplacian differential equationsNonlinear Analysis: Real World Applications, 34 (2017) 507–519.