Positive Solutions for a Derivative Dependent p-Laplacian Equation with Riemann-Stieltjes Integral Boundary Conditions

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Abstract

In this talk, we will discuss the existence of two non-trivial positive solutions to a class of boundary value problems (BVP), involving a p-Laplacian, of the form:

$$\begin{aligned}(\Phi_p(x^{'}))^{'} + g(t)f(t,x,x') = 0, \quad t \in (0,1),\\ x(0) - ax^{'}(0) = \alpha[x],\\ x(1) + bx^{'}(1) = \beta[x],\end{aligned}$$

where $\Phi_p(x) = |x|^{p-2}x$ is a one dimensional p-Laplacian operator with $p > 1, a, b$ are real constants. Here α, β are given by Riemann-Stieltjes integrals

$$\alpha[x] = \int_0^1 x(t)dA(t), \quad \beta[x] = \int_0^1 x(t)dB(t),$$

where A and B are functions of bounded variations. We will use the fixed point index theory to establish our results.

[1]Joint work with S. Padhi