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:

$$(\Phi_p(x'))' + g(t)f(t,x,x') = 0, \quad t \in (0,1),$$

$$x(0) - ax'(0) = \alpha[x],$$

$$x(1) + bx'(1) = \beta[x],$$

where $\Phi_p(x) = |x|^{p-2}x$ is a one dimensional $p$-Laplacian operator with $p > 1$, $a, b$ are real constants. Here $\alpha, \beta$ 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.

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1Joint work with S. Padhi