
A TOPOLOGICAL APPROACH TO STIELTJES DIFFERENTIAL EQUATIONS

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In this talk we will begin with a concise introduction to Stieltjes calculus, highlighting the key concepts needed for our analysis. We then present recent results on the application of fixed point index theory in cones to boundary value problems involving Stieltjes differential equations [1].

We will focus on a generalized periodic problem with nonlocal boundary conditions of the form

$$\begin{cases} u'_g(t) + b(t)u(t) = f(t, u(t)), & t \in [0, T], \\ u(0) = u(T) + k B(u). \end{cases}$$

Our approach builds upon techniques related to the constant-sign properties of Green's functions. This framework yields effective criteria for the existence, nonexistence, and multiplicity of solutions.

This presentation is based on joint work with Prof. Vera Krajščáková [1].

[1] Krajščáková, V. and Tojo, F. A. F. (2024). *Existence and multiplicity of solutions of Stieltjes differential equations via topological methods*. J. Fixed Point Theory Appl., 26(1), 1–23. doi: 10.1007/s11784-024-01098-8.

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