

INTEGRAL AND FUNCTIONAL DIFFERENTIAL EQUATIONS

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Two positive solutions for a second-order nonlinear problem with mixed boundary conditions

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In this work, we prove the existence of two positive solutions of a second-order nonlinear problem with mixed boundary conditions. The proof of our main result relies on Mawhin's coincidence degree.

[1] Peixoto, A., Existence of positive solution for a nonlinear problem with mixed conditions. Rend. Istit. Mat. Univ. Trieste, accepted for publication (to appear in the next edition).

[2] Boscaggin, A., Feltrin, G., & Zanolin, F., Pairs of positive periodic solutions of nonlinear ODEs with indefinite weight: a topological degree approach for the super-sublinear case, Royal Society of Edinburgh, 146A,(2016), 449 - 474.

[3] Gaines, R. E. & Mawhin, J., Coincidence Degree, and Nonlinear Differential Equations, vol. 568 of Lecture Notes in Mathematic, Springer, (1977).

[4] Mawhin, J., Topological degree methods in nonlinear boundary value problems, vol. 40 of CBMS Regional Conference Series in Mathematics, American Mathematical Society, Providence, R.I., (1979).

[5] Feltrin, G. & Zanolin, F., Existence of positive solutions in the superlinear case via coincidence degree: the Neumann and the periodic boundary value problems, Advances in Differential Equations, **20** (2015), 937 - 982.

Gronwall inequality for Stieltjes integrals

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In this talk, we will discuss about a new Gronwall inequality for Stieltjes integrals (Kurzweil and Lebesgue) [1]. This new theorem improves several existing results and has a simple proof derived from the quotient rule for Stieltjes integrals [2]. Moreover, we will present a uniqueness theorem for measure differential equations.

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[1] Gallegos, C. A.; Márquez Albés, I.; Slavík, A., A general form of Gronwall inequality with Stieltjes integrals, J. Math. Anal. Appl. 541, no. 1, Paper No. 128674, 18 pp. (2025).

[2] Márquez Albés, I.; Slavík, A., The logistic equation in the context of Stieltjes differential and integral equations, Electron. J. Qual. Theory Differ. Equ. 2023 (2023) 10.