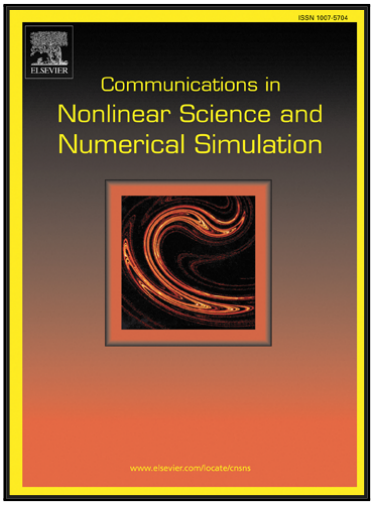

Existence of positive periodic solutions of some nonlinear fractional differential equations

Alberto Cabada, Tomáš Kisela

PII: S1007-5704(17)30057-6
DOI: 10.1016/j.cnsns.2017.02.010
Reference: CNSNS 4117

To appear in: *Communications in Nonlinear Science and Numerical Simulation*

Received date: 8 October 2016
Revised date: 1 February 2017
Accepted date: 10 February 2017

Please cite this article as: Alberto Cabada, Tomáš Kisela, Existence of positive periodic solutions of some nonlinear fractional differential equations, *Communications in Nonlinear Science and Numerical Simulation* (2017), doi: 10.1016/j.cnsns.2017.02.010

Highlights

- The paper study the existence of periodic solutions of nonlinear fractional differential equations admitting its right-hand side with certain singularities.
- Our approach is based on Krasnoselskii fixed point theorem and monotone iterative techniques
- The discussed problems are characterized by a Green's function which has integrable singularities disallowing a direct use of classical techniques known from theory of ordinary differential equations.
- The problem we study is original and, to our knowledge, is not treated in any referenced paper. The approaches used by other authors cannot be utilized since it is prevented by the type of singularities contained in right-hand side of our examples.
- We present some numerical algorithms that do not seem to be used for these kind of problems in the literature (especially not in the connection with lower and upper solutions). We believe that their simplicity and straightforwardness might be of a great interest of many researches who seek for numerical solutions of nonlinear fractional differential equations which is a topic currently not well-established and rapidly evolving. For the same reasons we believe that they could serve as an inspiration for further research of advanced numerical methods.
- Illustrative examples are showed on the paper.