

## POSITIVE SOLUTIONS FOR FRACTIONAL INTEGRO-BOUNDARY VALUE PROBLEM OF ORDER $(1, 2)$ ON AN UNBOUNDED DOMAIN

VIDUSHI GUPTA AND JAYDEV DABAS

*Abstract.* In this manuscript, we study a system of fractional integro boundary value problem on unbounded domain. The solution of the system is defined in terms of the Green's function. We have established the existence and uniqueness results by utilizing the fixed point theorems. The main outcomes and assumptions are verified via some examples.

*Mathematics subject classification* (2010): 34A12, 34B18, 34B40, 34B10.

*Keywords and phrases:* Existence of solution, boundary value problems, Riemann-Liouville fractional derivative, infinite interval, fixed point theorems.

### REFERENCES

- [1] A. A. KILBAS, H. M. SRIVASTVA AND J. J. TRUJILLO, *Theory and Applications of Fractional Differential Equations*, Elsevier, Amsterdam, 2006.
- [2] I. PODLUBNY, *Fractional Differential Equations*, Academic Press, New York, 1999.
- [3] G. SAMKO, A. KILBAS AND O. MARICHEV, *Fractional Integrals and Derivatives*, Theory and Applications, Gordon and Breach, Amsterdam, 1993.
- [4] Z. B. BAI AND H. S. LIU, *Positive solutions for BVP of nonlinear fractional differential equation*, J. Math. Anal. Appl. **311**, (2005), 495–505.
- [5] N. NYAMORADI, T. BASHIRI, S. M. VAEZPOUR AND D. BALEANU, *Uniqueness and existence of positive solutions for singular fractional differential equations*, Electronic Journal of Differential Equations, Vol. 2014 No. **130**, (2014), 1–13.
- [6] Y. LI AND G. LI, *Positive solutions of  $p$ -Laplacian fractional differential equations with integral boundary value conditions*, J. Nonlinear Sci. Appl. **9**, (2016), 717–726.
- [7] Y. WANG AND Y. YANG, *Positive solutions for Caputo fractional differential equations involving integral boundary conditions*, J. Nonlinear Sci. Appl. **8**, (2015), 99–109.
- [8] W. YANG, *Positive solutions for singular coupled integral boundary value problems of nonlinear Hadamard fractional differential equations*, J. Nonlinear Sci. Appl. **8**, (2015), 110–129.
- [9] A. V. BICADZE AND A. A. SAMARSKII, *Some elementary generalizations of linear elliptic boundary value problems*, Doklady Akademii Nauk SSSR, vol. **185**, (1969), 739–740.
- [10] Y. ZOUA AND G. HE, *On the uniqueness of solutions for a class of fractional differential equations*, Applied Mathematics Letters **74**, (2017), 68–73.
- [11] Z. YUE AND Y. ZOU, *New uniqueness results for fractional differential equation with dependence on the first order derivative*, Advances in Difference Equations (2019) 2019:38.
- [12] Y. CUIA, W. MAA, Q. SUNA AND X. SUC, *New uniqueness results for boundary value problem of fractional differential equation*, Nonlinear Analysis: Modelling and Control, **23**, (1) (2018), 31–39.
- [13] Y. CUI, *Uniqueness of solution for boundary value problems for fractional differential equations*, Applied Mathematics Letters **51**, (2016), 48–54.
- [14] X. ZHAO, W. GE, *Unbounded Solutions for a Fractional Boundary Value Problems on the Infinite Interval*, Acta Appl Math, **109**, (2010), 495–505.
- [15] A. G. LAKOUD, A. KILICMAN, *Unbounded solution for a fractional boundary value problem*, Guezane-Lakoud and Kiliçman Advances in Difference Equations, 2014:154 (2014).

- [16] Y. GHOLAMI, *Existence of an unbounded solution for multi point boundary value problems of fractional differential equations on an infinite domain*, *Fractional Differential Calculus*, **4** 2, (2014), 125–136.
- [17] F. TOUMI AND Z. Z. EL ABIDINE, *Existence of Multiple Positive Solutions for Nonlinear Fractional Boundary Value Problems on the Half-Line*, *Mediterr. J. Math.* **13**, (2016), 2353–2364.
- [18] A. BEMEZAI AND A. SAADI, *Existence results for a nonlinear fractional differential equations with integral boundary conditions on the half line*, *Differential Equations and Applications Volume 7, Number 3*, (2015), 333–346.
- [19] X. ZHANG, *Existence of positive solutions for boundary value problems for second order nonlinear differential equations on the half line*, *Electron. J. Differ. Equ.* **141**, (2009), 1–10.
- [20] A. GUEZANE-LAKOUD AND R. KHALDI, *On boundary value problem at resonance on the half line*, *Journal of Fractional Calculus and Applications* **8** (1), (2017), 159–167.
- [21] D. WANG AND G. WANG, *Integro-differential fractional boundary value problem on an unbounded domain*, *Wang and Wang Advances in Difference Equations* (2016) 2016:325.
- [22] A. FRIQUI, A. GUEZANE-LAKOUD AND R. KHALID, *Fractional boundary value problems on the half line*, *Opuscula Math.* **37**, 2 (2017), 265–280.
- [23] L. ZHANG, B. AHAMAD AND G. WANG, *Monotone Iterative Method for a Class of Nonlinear Fractional Differential Equations on Unbounded Domains in Banach Spaces*, *Filomat* 31:5 (2017), 1331–1338.
- [24] R. P. AGARWAL, M. MEEHAN AND D. O’REGAN, *Fixed Point Theory and Applications*, Cambridge University Press, Cambridge, 2001.
- [25] C. S. GOODRICH, *Existence of a positive solution to a class of fractional differential equations*, *Applied Mathematics Letters* **23**, (2010), 1050–1055.