

Space-time fractional differential equations

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We present explicit solutions of a class of generalized space-time fractional Cauchy problems with time-variable coefficients [3, 4]. The representation of a solution involves kernels given by convergent infinite series of fractional integro-differential operators, which can be extensively and efficiently applied for analytic and computational goals [2]. We also study inverse Cauchy problems of finding time dependent coefficients for fractional wave and heat type equations, which involve the explicit representation of the solution of the direct Cauchy problem and a recent method to recover variable coefficients for the considered inverse problems [1].

References

- [1] M. Karazym, T. Ozawa, D. Suragan. Multidimensional inverse Cauchy problems for evolution equations, *Inverse Probl. Sci. En.* 28(11), (2020), 1–9.
- [2] J. E. Restrepo, M. Ruzhansky, D. Suragan. Explicit solutions for linear variable-coefficient fractional differential equations with respect to functions. *Appl. Math. Comput.* 403 (126177), (2021).
- [3] J.E. Restrepo, D. Suragan. Direct and inverse Cauchy problems for generalized space-time fractional differential equations. *Adv. Differential Equations*, (2021).
- [4] J.E. Restrepo, M. Ruzhasky, D. Suragan. Generalized time-fractional Dirac type operators and Cauchy type problems. Under review, (2020).