BOOK OF ABSTRACTS

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Content

$$-\frac{\Gamma(-\frac{3}{4})}{\Gamma(\frac{1}{4}-\beta)}\eta^2 K_1\left(\frac{1}{4}-\beta;\frac{7}{4},\frac{3}{2};-\frac{\eta^4}{4},-\frac{1}{4}\lambda^2 y^2\right), \tag{15}$$

where $k_0=\frac{\Gamma(\beta+1/2)}{\sqrt{\pi}}$, $k_1=\frac{\Gamma((1/2)-\beta)}{\sqrt{\pi}}$,

$$K_1(a,b,c;x,y)=\sum_{m=0}^{\infty}\frac{y^m}{(a)_m m!}{}_1F_2(1-a-m;b,c;x),$$

and ${}_1F_2(a;b,c;z)$ is the generalized hypergeometric function.

REFERENCES

[1] S. G. Samko, A. A. Kilbas and O. I. Marichev,Fractional Integrals and Derivatives. Theory and Applications, Gordon and Breach, New York NY, (1993).

[2] Polianin A.D., "Handbook of Linear Partial Differential Equations for Engineers and Scientists", Chapman and Hall/CRC Press:, Boca Raton, FL, USA, (2002).

[3] Prudnikov A.P., Brychkov Yu.A., Marichev O.I. "Integrals and series", In 3 volumes. T. 1. Elementary functions.- 2nd ed., corrected.- M.: FIZMATLIT, 2002.– 632 p.

The existence and uniqueness of the inverse problem for the sequential fractional telegraph equation

Rajabboy Saparboyev

In this paper, we investigate the inverse problem of identifying the kernel in a one-dimensional time-fractional telegraph equation with the Caputo time derivative, subject to initial-boundary and overdetermination conditions. Initially, an equivalent auxiliary problem is formulated to simplify the analysis.

The Fourier method is employed to convert this auxiliary problem into a system of integral equations. By utilizing properties of the Mittag-Leffler function and the successive approximation technique, an estimate for the direct problems solution is derived based on the norm of the unknown kernel, facilitating the investigation of the inverse problem. The inverse problem is then transformed into an equivalent integral equation, which is solved using the contraction mapping principle. The analysis establishes the local existence and global uniqueness of the solution under specified conditions.