

## Existence and Uniqueness of Solutions for a Class of Fractional Partial Differential Equations Using Perov-Type Fixed Point Theorems

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### **Abstract**

Fractional partial differential equations (FPDEs) often do not admit analytical solutions, which necessitates the development of rigorous mathematical methods to guarantee the existence and uniqueness of their solutions. This study examines a class of fractional equations involving Caputo derivatives and Le`vy processes. By reformulating the fractional differential equations into equivalent integral forms, C`iric`s generalized contraction principle and Perov-type fixed point theorems are applied to establish the existence and uniqueness of fixed points within a suitable metric space. The proposed framework provides a unified and flexible approach for analyzing both stochastic differential equations (SDEs) and FPDEs encountered in financial modeling.