



Superlinear Problem with Inverse Coefficient for a Time-Fractional Parabolic Equation with Integral Over-Determination Condition

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Abstract: The inverse problem of finding the right-hand side of a nonlinear fractional parabolic equation with an integral over-determination supplementary condition is examined in this study. The functional analysis method, which is based on energy inequality and the density of the range of the operator created by the problem addressed, is used to demonstrate the existence, uniqueness, and continuous dependence on the data of the direct problem. The existence theorem is then obtained from the solution of the given problem, starting with the uniqueness theorem, making the energy inequality method, also known as the method of a priori estimates, a higher character method. The hardest part of this approach is figuring out which functional spaces to use, E and F, and if the inverse problem can be solved uniquely under the right circumstances. The existence and uniqueness of the solution to the inverse problem, which arises frequently in engineering and physics modeling of diverse processes, are established using the fixed point theorem.

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