SOLVABILITY OF BOUNDARY VALUE PROBLEMS WITH INTEGRAL CONDITIONS FOR FRACTIONAL DIFFERENTIAL EQUATIONS

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Abstract. In this paper, we study boundary value problems with integral conditions for fractional differential equations of the order \( \alpha \in (1, 2) \) in an abstract Banach space. To overcome the difficult from some mixed integral terms in a fractional integral equation, a necessary Gronwall inequality with some mixed integral terms is established to obtain important a priori bounds. Some sufficient conditions for the existence of solutions are presented by means of fractional calculus and fixed point theorems via different conditions and techniques. An example is given to illustrate the results.

Key Words and Phrases: Fractional differential equations, Boundary value problems, Integral conditions, Generalized Gronwall inequality, Fixed point method.

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