Existence of solutions to the fractional differential equations(FDEs) via fixed point theorems(FPTs) in Real Banach Space

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Abstract

As we have studied classical calculus (differential Equations and Integral equations), Fractional Differential Equation(FDE) is the generalization of ordinary differential equation, which is consider as an old but novel topic as well. Over the last two decades, numerous researchers have been drawn to the applications of FDE in the fields of biology and engineering.

So in this chapter, we have covered the introduction of FDE, types of FDE, FDE in real banach space, Fixed Point Theorems (FPTs) such as Avery-Peterson's FPT, Krasnoselskii's FPT, Schauder's FPT, Leray-Schauder's FPT, Banach Contraction Mapping Principle, Leggett-Williams FPT, etc. Also we have defined some general solutions, Green's function, completeness theorem, lipschitz condition, some solved problems in FDE and most significantly, we studied the Existence of positive solutions using FPTs in real banach space involving fractional order differential operators. For more study we refer the monographs by Kilbas el al.[1], Lakshmikantham[2], Podlubny[3], Samko et al.[4], ets.

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