STUDY OF FIXED POINTS OF DIFFERENT CONTRACTIONS AND SOME APPLICATIONS

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

Doctor of Philosophy

by

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ABSTRACT

Various disciplines of Mathematics furnishes effective tools to solve numerous real world problems which arises in the different branches of science and other subjects. Banach fixed point hypothesis is a significant device in the hypothesis of metric spaces, it guarantees the presence and uniqueness of fixed point of specific kinds of self mappings in a metric space. It has an immense application in some dynamic economic models, in the proof of Picard–Lindelöf theorem, in the proof of Nash embedding theorem etc. Over the years so many mathematicians have been extended and generalized the Banach fixed point theorem for variety of contractive mappings in the context of various abstract spaces. Inspired by the existing literature in this area, in this assertion we will provide some new results which will generalize and extend some of the previous results in the literature.

Firstly in this thesis, we study fixed point results in the orthogonal metric spaces. Also, we extend the F contraction in orthogonal metric spaces and establish fixed point theories by using w-distance. By utilizing the fixed point results obtained we will construct a tool to establish the existence of solution of two different types of second order differential equations.

After this, we also establish some fixed point results for functions satisfying some conditions in a Banach spaces by using the measure of non-compactness. Moreover, we employ the obtained fixed point results to ensure the existence of solutions to non-linear quadratic integral equations.

Latter on, we evaluate fixed point results for weakly asymptotic contractions defined on usual metric spaces. Also,we use our acquired outcomes to solve a fourth order two-point boundary value problem which is a specific kind of cantilever beam problem.

Finally, in the last part we extend the Banach fixed point theory to existence and uniqueness of fixed point for a particular kind of contractive mappings in a newly emerged modular metric spaces. Additionally, we construct a common fixed point theorem for functions satisfying a contractive condition in the context of modular metric space.

Throughout the thesis, we provide some various non-trivial constructive

examples to justify the validity of obtained results.

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