Abstract

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Project Title : Best Proximity Points and Global Optimal Approximate Solutions

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Abstract:

The aim of this project is to establish the best proximity point theorems for generalized contractions mappings; there by producing optimal approximate solutions of certain fixed point equations. In addition to exploring the existence of the best proximity point for generalized contractions, an iterative algorithm is also presented to determine such an optimal approximate solution. Moreover, we also extend and generalize the notion of proximal contractions of self-contractions and establish the best proximity point theorems for these non-self mappings and also give examples to validate our main results.

Firstly, in this project focuses on the best proximity point theorems for proximal contractions of generalized contraction mappings which serve as non-self mapping analogues of generalized contraction self-mappings. Also, necessary and sufficient conditions are established for non-self contraction mappings to have the best proximity point, a common best proximity point and a couple best proximity point for pairs of contractive non-self mappings and for pairs of contraction non-self mappings, yielding common optimal approximate solutions of certain fixed point equations. Besides establishing the existence of common best proximity points, iterative algorithms are also furnished to determine such optimal approximate solutions. Secondly, in this project we also establish the best proximity point theorems for generalized contractive non-self for multi-valued mappings, yielding global optimal approximate solutions of certain fixed point

equations. As a consequence, it ascertains the existence of an optimal approximate solution to some equations for which it is plausible that there is no solution. An algorithm is exhibited to determine such an optimal approximate solution designated as the best proximity point. It is interesting to observe that the preceding best proximity point theorem includes the famous Banach contraction principle.

Keywords : best proximity points, fixed points, proximal contractions, contraction mappings, common best proximity points