CHAPTER I

INTRODUCTION

1.1 Background and importance of research

The fixed-point iteration process for nonlinear operators in Hilbert spaces and Banach spaces including Mann, Halpern and Isikawa iterations process have been studied extensively by many authors to approximate fixed point of various classes of operators in both Hilbert spaces and Banach spaces. In 1952, Mann [12] defined Mann iteration in a matrix formulation. In 1967, Halpern [7] introduced the new innovation iteration process which resemble in Mann's iteration. In 1974, Ishikawa [9] introduced Ishikawa iteration and studied its strong convergence theorem for Lipschitzian pseudo-contractive mappings in Hilbert spaces. On the other hand, construction of fixed points of nonexpansive mappings and finds application in a number of applied areas, in particular, in image recovery and signal processing.

Variational inequalities introduced by Stampacchia [20] in the early sixties have witnessed explosive growth in theoretical advances and applications across all disciplines of pure and applied sciences. Analysis of these problems requires a blend of techniques from functional analysis, convex analysis, and numerical analysis. In recent years, variational inequality theory has been extended and generalized in several directions, using new and powerful methods, to study a wide class of unrelated problems in a unified and general framework.

In 1994, equilibrium problems were introduced by Blum and Oettli [2] and by Noor and Oettli [15] as optimization problems and generalizations of variational inequalities. The equilibrium problem theory provides a novel and united treatment

of a wide class of problems which arise in finance, economics, ecology, elasticity, transportation, network and optimization. This theory has had a great impact and influence in the development of several branches of pure and applied sciences.

1.2 Objective

The objectives of research project

1.2.1 To construct the methods for approximating the solution to the fixed point problems for nonlinear mappings in Hilbert space.

1.2.2 Searching for the sufficient conditions for strong convergence that is constructed.

1.3 Research Benefits

The benefits of research project

1.3.1. To gain the method for approximating common fixed points for nonlinear mappings in Hilbert space

1.3.2. To gain the sufficient conditions for the strong convergence that is constructed.

1.3.3. To be the rudimentary knowledge of the application for Sciences and Engineering for all students in Bachelor degree, Master's degree and Doctoral degree at the Rajamangala University of Technology Rattanakosin.