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# ON SPLIT EQUALITY MIXED EQUILIBRIUM AND FIXED POINT PROBLEMS FOR COUNTABLE FAMILIES OF GENERALIZED $K_I-$ STRICTLY PSEUDO-CONTRACTIVE MULTI-VALUED MAPPINGS

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**Abstract.** In this paper, we introduce an iterative algorithm for finding a common solution of multiple-set split equality mixed equilibrium problem and fixed point problem for countably infinite families of generalized $k_i$ - strictly pseudo-contractive multi-valued mappings in real Hilbert spaces. Using our iterative algorithm, we obtain a weak and a strong convergence results for approximating the common solution of the aforementioned problems. Some applications were also given. Our results complements and extends some related results in literature.

**Keywords.** split equality mixed equilibrium problem; generalized $k_i$ strictly pseudo-contractive mapping; multi-valued mappings; iterative scheme; Fixed point problem .

**AMS (MOS) subject classification:** 2000 *: 47H06, 47H09, 47J05, 47J25.*

## 1. Introduction

**Definition 1.1.** *Let $H$ be a real Hilbert space and $CB(H)$ be the collection of all nonempty closed and bounded subsets of $H$, then the Hausdorff metric $\mathcal{H}$ on CB(H) is defined by:*

$$\mathcal{H}(A, B) = \max\{\sup_{x\in A} d(x, B), \sup_{y\in B} d(y, A)\},$$

*where* $d(x, B) = \inf_{y\in B} d(x, y)$.

**Definition 1.2.** *Let $T : H \to CB(H)$ be a multi-valued mapping. An element $x \in H$ is said to be a fixed point of $T$ if $x \in T(x)$.*

**Definition 1.3.** *Let $K$ be a nonempty subset of a Hilbert space $H$. A map $T : K \to H$ is called pseudo-contractive if there exists $k \in [0, 1)$ such that*

$$||Tx - Ty||^2 \leq ||x - y||^2 + k||(x - Tx) - (y - Ty)||^2, \quad \forall x, y \in K.$$

**Definition 1.4.** [17] *Let $H$ be a real Hilbert space and $D$ a nonempty, open and convex subset of $H$. Let $T : \overline{D} \to CB(\overline{D})$ be a mapping. Then $T$ is called*