NUMERICAL RECKONING OF FIXED POINTS FOR GENERALIZED $(\alpha, \beta)-$NONEXPANSIVE MAPPINGS IN HYPERBOLIC SPACES

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Abstract: This paper deals with the SRJ iteration process for approximating the fixed point of generalized $(\alpha, \beta)-$nonexpansive mappings in hyperbolic spaces. Furthermore, we establish a strong and Δ-converges theorem for generalized (α, β)-nonexpansive mapping in hyperbolic space. Finally, we present a numerical example to illustrate our main result and then display the efficiency of the proposed algorithm compared to different iterative algorithms in the literature. Our results obtained in this paper improve, extend and unify some related results in the literature.

Keywords and Phrases: Hyperbolic spaces, generalized $(\alpha, \beta)-$nonexpansive mapping, strong and Δ-convergence theorems.

2020 Mathematics Subject Classification: 47H10, 54H25, 54E50.

1. Introduction

We recall the following: Let G be a nonempty subset of a Banach space X and $\Phi \colon G \to G$ a self-mapping. A point $x \in X$ is said to be a fixed point of Φ if $\Phi x = x$.

Many researchers attracted in the direction of approximating the fixed points of nonexpansive mapping and its generalized form [3, 4, 9, 12, 14, 15, 18, 20, 21, 29] in a hyperbolic space.