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# Strong convergence theorems for generalized strict asymptotically pseudocontractive mapping in Hilbert spaces

Anupam Sharma[1*], Mohammad Imdad [2]

[1] Department of Mathematics and Statistics,
Indian Institute of Technology, Kanpur 208 016, India.
E-mail:annusharma241@gmail.com

[2] Department of Mathematics,
Aligarh Muslim University, Aligarh 202 002, India.
E-mail: mhimdad@yahoo.co.in

[*] *Corresponding Author*. E-mail: annusharma241@gmail.com

**Abstract.** In this paper, we introduce a new class of generalized strict asymptotically pseudocontractive mapping in a real Hilbert space and prove the strong convergence of three-step iteration scheme for a uniformly *L*-Lipschitzian and generalized strict asymptotically pseudocontractive mappings without assuming any form of compactness. The results presented in this paper improve and extend the corresponding results in the earlier and recent literature.

## 1 Introduction and preliminaries

It is well known that the class of pseudocontractive mappings is an important and significant generalization of nonexpansive mappings. Within the past 30 years or so, a great deal of effort has gone into the existence of fixed points of pseudocontractive mappings (including nonexpansive mappings) and iterative construction of fixed points of pseudocontractive mappings (including nonexpansive mappings); see, e.g., [7, 16, 21, 23, 28]. The iterative approximation problems for a nonexpansive mapping, an asymptotically nonexpansive mapping, and an asymptotically pseudocontractive mapping were studied extensively by Browder [3], Kirk [10], Goebel and Kirk [6], Schu [18], Xu [25, 26], Liu [11] in the setting of Hilbert space or uniformly convex Banach space.

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