The fastest Krasnoselskij iteration for approximating fixed points of strictly pseudo-contractive mappings

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ABSTRACT. Let X be a Banach space, K a nonempty closed convex subset of X and $T : K \to K$ a Lipschitzian strictly pseudo-contractive mapping. We show that, in order to approximate the fixed point of T, instead of the Mann iteration, usually considered by many authors, we may use a simpler method, i.e., the Krasnoselskij iterative process, for which, in addition, it is also possible to find the fastest iteration to compute the fixed point. Subsidiary, it is also pointed out that an assumption like $\lim_{n \to \infty} \alpha_n = 0$, involved in most convergence theorems for Mann iteration existing in literature, appears to be artificial and not necessary.

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