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Approximating common fixed points of two asymptotically quasi-nonexpansive mappings in Banach spaces

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Abstract
Suppose K is a nonempty closed convex subset of a real Banach space E. Let S, T : K → K be two asymptotically quasi-nonexpansive maps with sequences {un}, {vn} ⊂ [0 , ∞) such that ∑n=1∞ un < ∞ and ∑n=1∞ vn < ∞, and F = F(S) ∩ F(T) := {x ∈ K : Sx = Tx = x} ≠ ∅. Suppose {xn} is generated iteratively by x1 ∈ K, xn+1 = (1 - αn)xn + αnSn [(1 - βn)xn + βnTnxn], n ≥ 1 where {αn} and {βn} are real sequences in [0, 1]. It is proved that (a) {xn} converges strongly to some x * ∈ F if and only if lim inf n→∞d (xn, F) = 0; (b) if X is uniformly convex and if either T or S is compact, then {xn} converges strongly to some x * ∈ F. Furthermore, if X is uniformly convex, either T or S is compact and {xn} is generated by x1 ∈ K, xn+1 = αnxn+βn Sn[α′nxn +β′nTnxn +γ′nz′n] + γnzn, n ≥ 1, where {zn}, {z′n} are bounded, {αn}, {βn}, {γn}, {α′n}, {β′n}, {γ′n} are real sequences in [0, 1] such that αn+βn+γn = 1 = α′n+β′n +γ′n and {γn}, {γ′n} are summable; it is established that the sequence {xn} (with error member terms) converges strongly to some x* ∈ F. © 2006 N. Shahzad and A. Udomene.

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