

PROJECTING POINTS BETWEEN CONVEX SETS

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Let X and Y be two closed subspaces of a Hilbert space. If we send a point back and forth between them by orthogonal projection, the iterates converge to the projection of the point onto the intersection of X and Y . If, more generally, X and Y are just two intersecting closed and convex sets and we send the point back and forth between them by the nearest point projection, the sequence so obtained does not have to converge any more.

Given a finite family of closed convex sets with non-empty intersection, we again obtain a sequence by iterating the nearest point projection of a point onto these sets. We will relate the convergence of this sequence to the geometry of the convex sets and to the choice of the order in which we project onto them. For example, the symmetry of the sets, and projecting in every step on the remotest convex set implies convergence.