Preimages of metric projection mappings in Hilbert spaces

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Abstract

The closure of preimages (inverse images) of metric projection mappings to a given set in a Hilbert space are investigated. In particular, some properties of fibers over singletons (level sets or preimages of singletons) of the metric projection are provided. One of them, a sufficient condition for the convergence of minimizing sequence for a giving point, ensures the convergence of a subsequence of minimizing points, thus the limit of the subsequence belongs to the image of the metric projection. Several examples preserving this sufficient condition are provided. It is also shown that the set of points for which the sufficient condition can be applied is dense in the boundary of the preimage of each set from a large class of subsets of the Hilbert space.

References

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