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Chebyshev and Klee sets with respect to Bregman distances

A set is called Chebyshev if every point has a unique nearest point in it. It is well known that—in Euclidean space—a set is Chebyshev if and only if it is closed, convex and nonempty. The corresponding Hilbert space question remains a famous open problem. Most studies have focused on obtaining results in general Banach space, under additional assumptions on the Chebyshev set.

A related question—again open in Hilbert space—concerns Klee sets and farthest points, which turn out to be singletons in Euclidean space.

In this talk, I will survey recent results on Chebyshev and Klee sets that revisit these questions from a new perspective: rather than working with a distance induced by a Banach space norm, we consider the Bregman distance induced by a well-behaved convex function.

Based on joint works with Mason Mackelm (UBCO), Jason Sewell (UBCO), Shawn Wang (UBCO), Jane Ye (UVic), Xiaoming Yuan (Hong Kong Baptist University).