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Separating Hyperplanes of Convex Sets

Combining existing approaches, we provide a uniform way to describe all hyperplanes which separate (properly, or strongly) a given pair of nonempty convex sets K_1 and K_2 in the *n*-dimensional Euclidean space. The method is based on considering (n-1)-dimensional subspaces which bound the set $K_1 - K_2$ and then using properties of the polar cone $(K_1 - K_2)^\circ$. First, we characterize all separating hyperplanes with given normal vectors, and then those containing a given point. We also describe the union of all hyperplanes separating (properly separating) a given pair of convex sets.

Keywords: Separation, hyperplane, convex, cone.

MSC: 52A20, 90C25.