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The Equivalence of The Illumination and Separation Conjectures

Let K be d-dimensional convex body in $\mathbb{E}^d$, and let $Q \in \mathbb{E}^d \setminus K$. A point P on the boundary of K is said to be illuminated by Q if the ray emanating from Q through P intersects the interior of K. One can ask what is the smallest positive integer n such that there exists a set of distinct points $\{Q_1, \ldots, Q_n\}$ whereby every boundry point of K is illuminated by at least one of the Q_i's. The illumination conjecture (formulated by I. Gohberg, H. Hadwiger, and A. Markus) states that $n \leq 2^d$. Surprisingly, 2^d is also the conjectured maximum number of hyperplanes that are necessary to separate any interior point O of K from any face of K. In this talk, I will outline K. Bezdek's proof that the Illumination Conjecture and the Separation Conjecture are indeed equivalent.