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A Mathematical Programming Approach to Strong Separation in Normed Spaces

This paper deals with an infinite-dimensional optimization approach to the strong separation of two bounded sets in a normed space. We present an approximation procedure, called Algorithm (A), such that a semi-infinite optimization problem must be solved at each step. Its global convergence is established under certain natural assumptions, and a stopping criterion is also provided. The particular case of strong separation in the space $L_p(\mathbb{X}, \mathcal{A}, \mu)$ is approached in detail. We also propose Algorithm (B), which is an implementable modification of Algorithm (A) for separating two bounded sets in $L_p([a, b])$, with $[a, b]$ being an interval in \mathbb{R} . Some illustrative computational experience is reported, and a particular stopping criterion is provided for the case of functions of bounded variation in $L_2([a, b])$.

Keywords: Strong separation, infinite dimensional optimization, semi-infinite programming.

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