Approximation of Convex Set by Compactly Semidefinite Representable Set

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Abstract : The approximation of convex set by semidefinite representable set plays an important role in semidefinite programming, especially in modern convex optimization. To optimize a linear function over a convex set is a hard problem. But optimizing the linear function over the semidefinite representable set which approximates the convex set is easy to solve as there exists numerous efficient algorithms to solve semidefinite programming problems. So, our approximation technique is significant in optimization. We develop a technique to approximate any closed convex set, say K by compactly semidefinite representable set. Further we prove that there exists a sequence of compactly semidefinite representable sets which give tighter approximation of the closed convex set, K gradually. We discuss about the convergence of the sequence of compactly semidefinite representable sets to closed convex set K. The recession cone of K and the recession cone of the compactly semidefinite representable set are equal. So, we say that the sequence of compactly semidefinite representable sets converge strongly to the closed convex set K. Thus, this approximation technique is very useful development in semidefinite programming.
Keywords : semidefinite programming, semidefinite representable set, compactly semidefinite representable set, approximation

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