CALCULATION METHODS FOR ROBUSTNESS OF FEASIBILITY VIA SET CHARACTERIZATION FUNCTIONS

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Sublinear characterization theorems for set relations are technical tools in considering set comparisons. Characterization functions give dual scalable expression of set relations in the theorems and they are further extension of Gordan's theorem of the alternative ([1]). We can algorithmically calculate values of the function by an optimization solver under some convex situations (e.g. [2]).

In the literature, characterization functions are utilized in the following ways for examples. In set optimization, the functions can perform a direct role in scaling set comparisons (e.g., ([3])). This means that they give conditions to figure out an optimal solution in a given feasible family of sets.

In vecter optimization, they can be used to describe sensitivity analysis. When we consider certain relation of vectors such as preference or ordering, pointwise comparisons are usually weak in insuring reliability or validity against some errors. We have to carefully see cases where a small error causes a large collapse of the relation or an original optimization problem. The characterization functions can help the relation by dealing with an error set including an ideal vector (e.g., [4], [5]).

This talk introduces the characterization theorems to show their geometric architecture and some reduced programs to get their values under specific conditions. As an application to vector optimization, we observe that this characterization can describe sensitivity of the feasibility of a given optimization program against small deviation on its parameters.

References

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