

Recent Advances in Data Mining and Their Potential in Life and Human Sciences and Game Theory

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This paper is motivated by recent advances in gene-environment Networks under uncertainty, the collaboration of Kyoto Protocol being one example here. In fact, the genes and further items in these regulatory Networks and related dynamical systems are regarded in a generalized way and viewed as actors (players). Our paper deals with the ellipsoidal core for cooperative ellipsoidal games, a class of transferable utility games where the worth of each coalition is an ellipsoid instead of a real number. Ellipsoids are a suitable data structure whenever data are affected by uncertainty and there are some correlations between the items under consideration. In the real world, noise in observation and experimental design, incomplete information, vagueness in preference structures and decision making are common sources of uncertainty, besides technological and market uncertainty. It is often easy to forecast ranges of values for uncertain data. Nevertheless, the representation of data uncertainty in terms of ellipsoids is more suitable than the error intervals of single variables since ellipsoids are directly related to covariance matrices. The ellipsoidal core has been recently introduced by Weber, Branzei and Alparslan Gök to answer the important question “How to deal with reward/cost sharing problems under ellipsoidal uncertainty?”. Here, we study properties of this solution concept, relate it with the interval core for cooperative games whose characteristic functions are interval-valued, and present conditions for the non-emptiness of the ellipsoidal core of a cooperative ellipsoidal game.