Abstract

In this work we consider the question of how to allocate the worth of a certain system in a meaningful way to its single parts. We take an economic point of view and consider a system as a set of resources in a broad sense. The worth of a set of resources is then modeled by a so-called weighted (cooperative) game. In particular, we introduce a notion of acceptable resp. stable prices based on a game between an investor and some players owning resources. Thereby, the investor tries to buy all resources from the players, and a stable price is defined as a price per unit of resource such that each player sells his entire amount of resources. The set of all such stable prices is then called the weighted core of the game. In contrast to the classical model of cooperative games, we allow for multiple (identical) units of the same resource and assume that the same price is allocated to different units of the same resource.

We then investigate this weighted core, generalizing notions of cooperative game theory and introducing two greedy algorithms in order to construct stable prices. We study sufficient and necessary properties for these algorithms to work correctly and examine relations between them. Moreover, we investigate particular classes of weighted games based on linear production processes (*i. e.*, based on solving certain linear programs). In this context stable prices turn out to be strongly related to optimal solutions of the corresponding dual problems (also known as shadow prices). Finally, we consider an application in the field of decision theory.