Single period portfolio selection models with transaction costs and initial holdings

Marius Rădulescu and Constanţa Zoie Rădulescu

Institute of Mathematical Statistics and Applied Mathematics, Casa Academiei Romane, Calea13 Septembrie nr.13, Bucharest 5, RO-76100, ROMANIA,
e-mail: mradulescu.csmro@yahoo.com

We extend Markowitz's portfolio selection model to include transaction costs in the presence of initial holdings for the investor. Our approach is new. We obtain a multiobjective optimization model which includes complementarity constraints. The objective functions are risk and expected return. Starting from the multiobjective optimization model we formulate several single objective models.
The single period models include a minimum risk model and a maximum expected return model.
Our portfolio selection models include complementarity constraints. This type of constraints increases the difficulty of the problems, which now enter in the category of combinatorial optimization problems. The set of feasible solutions for the problems from the above mentioned class is the union of a set of convex sets but it is no longer convex. We build equivalent mixed integer models for the single period portfolio selection models. We provide heuristic algorithms for finding solutions of portfolio selection models. Several numerical results are discussed.