Second Order Stochastic Dominance in Optimization Problems via Empirical Data
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Stochastic dominance is generally used to compare distributions of two random variables. Simultaneously, the stochastic dominance guarantees a solution corresponding to partial order between utility functions in a given subsystem \(U\) of the utility functions. Especially, considering \(U := U_1\) (where \(U_1\) is a system of non decreasing concave non negative utility functions) we can often obtain an optimization problem with second order stochastic dominance constraints. Evidently this is reason why the second order stochastic dominance constraints are very often employed in stochastic optimization problems. However, second order stochastic dominance can be also useful for the mean-risk models. Both of these situations correspond to optimization problems going to semi-infinite optimization problems for which Slater’s condition is not necessary fulfilled. Consequently, it is often necessary to modify these problems a little. The aim of the contribution is to deal with the case when a construction of modified problem has to be done on the data base. We try to present approximating model that tends to the “theoretical“ one with an approximating error less than a given value. The rate of convergence will be also investigated. The case of heavy tails distribution (covering stable) will be mention separately. To obtain new results we recall the stability results based on the Wasserstein metric corresponding to \(L_1\) norm.
