

HOLISTIC PORTFOLIO VALUE FUNCTIONS FOR THE MULTI-OBJECTIVE PROJECT SELECTION PROBLEM

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ABSTRACT

This research introduces an approach to formulate and solve multi-objective project selection problems. The formulation enables representation of the objectives' non-constant marginal value by modeling them as non-linear portfolio value functions. The presentation discusses the requirements and presents a demonstration of the approach applied to an environmental project selection problem proposed in literature. We extend non-linear programming optimization software with a branch-and-bound implicit-enumeration solution technique to account for the binary nature of project-selection decision variables and find the solver provides a better optimized solution for a testing dataset compared to an off-the-shelf commercial non-linear solver. We discuss the decision maker elicitation requirements to formulate the portfolio value functions of the proposed approach compared to a previously proposed method. We highlight problem conditions the previously proposed method does not address.

Keywords: Project selection, multi-objective decision analysis, non-constant marginal value