

A new approach to project risk responses selection with considering risks interdependence

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Abstract

Risks are natural and inherent characteristics of major projects. Risks are usually considered independently in analysis of risk responses. However, most risks are dependent on each other and independent risks are rare in the real world. This paper proposes a model for proper risk response selection from the response basket with the purpose of optimization of defined criteria for projects. This research has taken into account the relationships between risk responses; especially the relationships between risks, which have been rarely considered in previous works. It must be pointed out that not considering or superficial evaluation of the interactions between risks and risk responses reduces the expected desirability and increases project execution costs. This model is capable of optimization of different criteria in the objective function based on the proposed projects. Multi-objective Harmony Search (MOHS) and Non-dominated Sorting Genetic Algorithm II (NSGA-II) are used to solve this model and the numerical results obtained are analyzed.

Keywords: Risk response; Project risk management; Risk interactions; NSGA-II algorithm; MOHS algorithm

1. Introduction

Naturally, there are different risks in projects, which will increase project costs and cause time delays if the corresponding strategies are not determined. In other words, management decision-making errors and time and project cost estimations will increase if the interior and exterior risk factors of the project are not identified. Risks can show up in any aspect of a project. Therefore, Project Risk Management (PRM) is an important issue for interested researchers in the field. PRM generally consists of three phases [1]: risk identification, risk analysis and risk response. Risk analysis refers to identification of documentation of the related risks. Risk assessment deals with the examination of identified risks, correction of risk descriptions and estimation of the effects and the corresponding possibilities. Risk response is associated with identification, assessment, selection and execution of necessary measures in order to decrease the likelihood of risks