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# Exact Algorithm for Matrix-based Project Planning Problems

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## Abstract

This paper proposes a new matrix-based project planning method that takes into consideration task importance or probability of completions thus determines and ranks the importance or probability of possible project scenarios and project structures. The proposed algorithm is fast, aims to select the most important project scenarios or the least cost/time demanding project structures. The algorithm is generic, can host several types of goals dictated by the characteristics of project management and as such can be the fundamental element of a project expert- and decision-making system.

### *Key words:*

Project Planning Methods, Decision-making tools, Exact algorithms, Supporting Traditional and Agile Project Managements

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## 1 Introduction

The most frequently used, traditional project planning methods, e.g. network-planning methods (Eisner (1962); Kelley (1961); Roy (1962); Wiest (1981)), Gantt charts (Wilson (2003)), Line of Balance methods (Badukale and Sabihuddin (2014)) primarily support the operative tasks of project planning. Having an accepted logic plan, where tasks and the dependencies between them are determined, we can schedule tasks and allocate costs and resources by using different kinds of network planning, cost and resource allocation methods (Brucker et al. (1999)). Having an accepted logic plan we can (only) schedule tasks and allocate costs and resources by using different kinds of network planning, cost and resource allocation methods (Brucker et al. (1999)). Since the tasks and dependencies between them are already determined these algorithms not really support decision-making problems like:

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