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Multi-Mode Resource Constrained Multi-Project Scheduling and Resource Portfolio Problem

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Abstract

This paper introduces a multi-project problem environment which involves multiple projects with assigned due dates; activities that have alternative resource usage modes; a resource dedication policy that does not allow sharing of resources among projects throughout the planning horizon; and a total budget. Three issues arise when investigating this multi-project environment. First, the total budget should be distributed among different resource types to determine the general resource capacities, which correspond to the total amount for each renewable resource to be dedicated to the projects. With the general resource capacities at hand, the next issue is to determine the amounts of resources to be dedicated to the individual projects. The dedication of resources reduces the scheduling of the projects' activities to a multi-mode resource constrained project scheduling problem (MRCPSP) for each individual project. Finally, the last issue is the efficient solution of the resulting MRCPSPs. In this paper, this multi-project environment is modeled in an integrated fashion and designated as the Resource Portfolio Problem. A two-phase and a monolithic genetic algorithm are proposed as

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