

A path relinking approach with ejection chains for the generalized assignment problem

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Abstract: The generalized assignment problem is a classical combinatorial optimization problem known to be NP-hard. It can model a variety of real world applications in location, allocation, machine assignment, and supply chains. The problem has been studied since the late 1960s, and computer codes for practical applications emerged in the early 1970s. We propose a new algorithm for this problem that proves to be more effective than previously existing methods. The algorithm features a path relinking approach, which is a mechanism for generating new solutions by combining two or more reference solutions. It also features an ejection chain approach, which is embedded in a neighborhood construction to create more complex and powerful moves. Computational comparisons on benchmark instances show that the method is not only effective in general, but is especially effective for type D and E instances, which are known to be very difficult.