The Uncapacitated Swapping Problem on Linear and Circular Tracks

S. Anily[1] and A. Pfeffer[2]

The Recanati School of Management, Tel-Aviv University, Israel, 69978

anily@post.tau.ac.il, pfeffer@post.tau.ac.il

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In the Swapping Problem (SP) each vertex of a given graph may initially contain an object of a known type, and it may be associated with a desired object of a different type. The initial and final arrangements are assumed to be balanced, namely that the total number of objects of each type is equal in both arrangements. A single vehicle of given capacity is available for shipping objects among the vertices. The SP is to compute a shortest route such that the vehicle can accomplish the rearrangement of the objects while following this route. The SP has many variations, depending on the graph structure and vehicle's capacity. In this talk we will present an overview on the research on this problem, and we will present new low-complexity polynomial-time exact algorithms for the uncapacitated SP on a line and on a circle.