

The Traveling Postman Problem with Linear Barriers

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1 Introduction

2 Description of the Problem

In this section, it is described the two problems that are considered in this paper: the Hampered Shortest Path Problem with Segments H-SPP-S and the Hampered Traveling Salesman Problem with Segments H-TSP-S .

In H-SPP-S , we have a source neighborhood $n_L \subset \mathbb{R}^2$ and a target neighborhood $n_R \subset \mathbb{R}^2$, that we assume to be convex sets and a set \mathcal{B} of line segments that plays the role of barriers that the drone cannot cross. The aim of the H-SPP-S is to find the best pair of points $(x_L, x_R) \in n_L \times n_R$ in the source and target neighborhoods that minimizes the length of the path that joins x_L to x_R without crossing any barrier $b \in \mathcal{B}$. It is important to remark that it is assumed that these line segments are opened, i.e., the drone can visit B_b or B'_b for the barrier b .

The endpoints of $b \in \mathcal{B}$ are notated by B_b and B'_b .

The H-TSP-S is an extension of the H-SPP-S where a neighborhood set \mathcal{N} is considered that plays the role of source and target neighborhoods in the H-SPP-S . The aim of the H-TSP-S is to seek the shortest route that visits each neighborhood $n \in \mathcal{N}$ exactly once and returns to the origin neighborhood without crossing any barrier $b \in \mathcal{B}$.