Metro Maps on Various Base Grids

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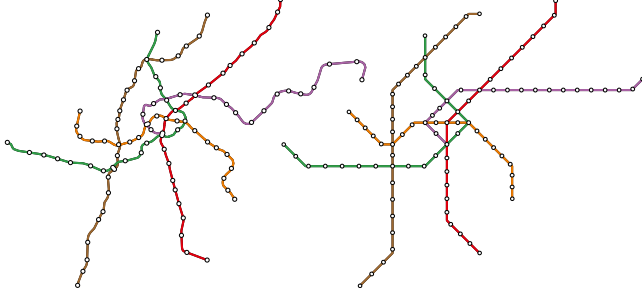Konstanz, Germany
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Figure 1: Left: The Vienna subway network, drawn with real-world geographical station positions and line courses. Right: Octilinear drawing by our approx. approach. Octilinearization took 202 ms.

ABSTRACT

Our interest is threefold. First, we would like to speed up the solution times of both the Linear Program and the approximation algorithm by using more sparse base grids. Second, we are interested in the capability of the original approach to render maps which are not octilinear, but for example orthoradial. Last, we want to investigate how a different base grid can be used to enlarge areas of high station density.

CCS CONCEPTS

• **Information systems** → **Geographic information systems**;
• **Theory of computation** → **Routing and network design problems**;

KEYWORDS

Public Transit, Map Matching, Schedule Data, GTFS

1 INTRODUCTION

1.1 Contributions

We consider the following as our main contributions:
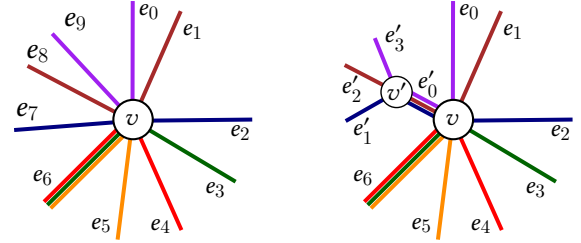
- A
- B

Figure 2: Left: Node v in an input line graph has a degree of 10, making it impossible to render the graph in an octilinear fashion. Right: We keep the first (in clockwise order) 7 adjacent edges of v, combine the lines of the remaining edges e_7, e_8 and e_9 into a single new edge e'_0 and connect it to a new non-station node v'. In reality, v' is given the exact same location as v to not distort node move penalties later on.
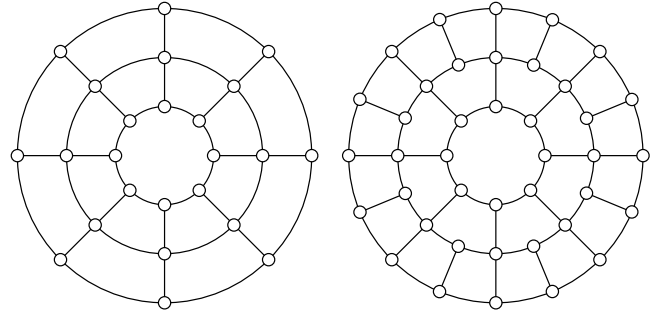

Figure 3: Two kinds of ortho-radial grid graphs. Left: Ortho-radial grid graph with $b = 8$ and a central node. Right: Ortho-radial grid graph where b is doubled each time the radius doubles.

1.2 Problem definition

1.3 Related Work

2 NODE SPLITTING

3 OCTILINEAR HANAN GRID

4 QUAD-TREE GRID

5 ORTHO-RADIAL GRID