

Bachelor Thesis

Assessment of approximation method for TSP path length on a road network: a simulation study

Koen Stevens (S5302137)

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Introduction

The Traveling Salesman Problem is an important problem in operations research. It is particularly relevant for last-mile carriers and other logistics companies where efficient routing directly impacts cost, time and service quality. Efficient approximation methods are important for practical applications where exact solutions are too computationally intensive to conduct. Beardwood, Halton, and Hammersley (1959) proved the relation:

$$L \rightarrow \beta\sqrt{nA}, \quad \text{as } n \rightarrow \infty \tag{1}$$

as an estimation for the length of the shortest TSP path measured by Euclidean distance through n random locations inside an area in \mathbb{R}^2 with area A , where β is some proportionality constant. This is an asymptotic result, but it also holds for small n in areas of regular shape, such as triangles or squares.

Literature Review

TODO

Methodology

References

Beardwood, Jillian, John H Halton, and John Michael Hammersley. 1959. "The Shortest Path Through Many Points." In *Mathematical Proceed-*

ings of the Cambridge Philosophical Society, 55:299–327. 4. Cambridge University Press.

Appendix

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print("Hello from Python!")
```