# Student/Bachelor/Master Project:
# Gurobi Performance Benchmarks for TD-TSP

*Description:* While HPC is already well established in research and development fields such as engineering and science, there is still much room for solving optimization problems in business administration and economics [1]. Considering the application area of logistics, there are a multitude of diverse planning problems of high relevance notably with respect to economic efficiency and ecological sustainability. Even simplified models of such problems from practice are often NP-hard. This project should investigate for the time-dependent traveling salesman problem (TD-TSP) [2] how the available mathematical optimization solver Gurobi [3] is already able to exploit parallel computing power of the shelf (considering shared memory multi-core parallelization).

*Prerequisites:*
- Basic Linux/shell skills
- Basic knowledge of working on an HPC cluster
- Basic data evaluation and visualization skills

*Activities:*
- Familiarize with linear and mixed-integer programming
- Familiarize with Gurobi
- Conduct performance benchmarks based on [4]

*Results:*
- Performance benchmarks, analyses and guidelines for optimal parameter choices on predefined scenarios (TD-TSP from [2])
- Improve the default solver settings [5] for the TD-TSP from [2]

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*References:*
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[2] A. Fink, S. Voß. European Journal of Operational Research 151(2), pp. 400-414, 2003.
[3] https://www.gurobi.com/
[4] D. T. Sanchez. Gurobi Optimization, LLC, 2022. https://www.gurobi.com/wp-content/uploads/intro_tuning.pdf
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