

Master Thesis (MA, 30 ECTS)

Space - Time Problems in TBM Data

Description

Today's tunnel boring machines (TBM) continuously record big amounts of data which is typically used for different geotechnical analyses. Although most geotechnical questions related to TBM data concern the spatial occurrence of certain phenomena (e.g. Where did a fault zone start? Where was a lithological change?), the data is recorded on a consistent temporal frequency (e.g. one datapoint every 2, 4, 10 seconds). Consequently, the datapoints have an equal temporal spacing, but due to different driving speeds (and other phenomena), they do not have an equal spatial spacing; e.g. slow excavation → many datapoints; fast excavation → few datapoints.

As there is a growing interest to use TBM data not only for contractual advance classification, prediction of the rockmass ahead or modern analyses related to machine learning, the goal of this thesis is to explore the impact and consequences of this space – time problem.

Workflow:

1. Literature research concerning TBM data in general and analysis of data series with heterogeneous datapoint spacing.
2. Data analysis of TBM Data of the Brenner Base Tunnel.
3. Evaluation and interpretation of the results.



Due to the big amount of data, the analysis will require skills beyond MS Excel. Programming skills (Python) are recommended but can also be acquired during the thesis.

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