Chair for Computation in Engineering
Chair of Computational Modeling and Simulation

Modeling: ★☆☆☆☆
Mathematics: ★★☆☆☆
Programming: ★★★★★

Software Lab:

(Re-)Design of an Energy Optimisation Tool

Setting

The alignment model is the basis for planning a subway tunnel, and in particular, the fundamental source for the energy consumption of trains operated on the resulting track course. Even small changes to the alignment can cause significant changes to this energy consumption, and thus, have a substantial influence on the operational costs.
During the last years we developed several tools for a computer supported modelling of the alignment and for the calculation of the resulting energy consumption of a subway train. In particular, these tools allow the real-time recalculation of this information with every single modification of the planner, and finally, provide possibilities for an automatic optimization of a subway track.

Task

Redesign these tools and add functionality in order to get a working framework for calculating and optimising a train's energy consumption.
In particular, design a new GUI providing possibility:

- for the visualisation of an alignment model,
- for the modification of an alignment model,
- for the visualisation of the energy consumption,
- for the optimisation of the energy consumption.

Improve the implementation of the (existing) algorithms concerning the optimisation task, or/and improve the possibilities for the modification of the alignment.

Supervisors

Matthias Flurl, Chair for Computation in Engineering, flurl@bv.tum.de
Oliver Handel, Chair of Computational Modeling and Simulation, oliver.handel@tum.de

References

[1] **Flurl, M.**; Morelos, R.; Jubierre, J.; Mundani, R.-P.; Rank, E.: **Energy optimisation for subway trains by interactive track alignment planning.** In: Third International Conference on Railway Technology: Research, Development and Maintenance, Cagliari, Sardinia, Italy, 2016

[2] **Flurl, M.**; Jubierre, J.R.; Monjarez, C.; Morelos, R.; Watson, E.: **Interaktive Planung von U-Bahn Tunnels: Automatisierte Berechnung der Änderung des normierten Energieverbrauchs eines U-Bahn Zuges bei Änderung des zu Grunde liegenden Trassenverlauf.** In: Proc. of 26. Forum Bauinformatik Darmstadt, 2014