

## Masterarbeit zu vergeben

### Comparative analysis of several track irregularities modelling and synthesis methods and evaluation of their applicability for Fault Detection and Isolation (FDI) tasks

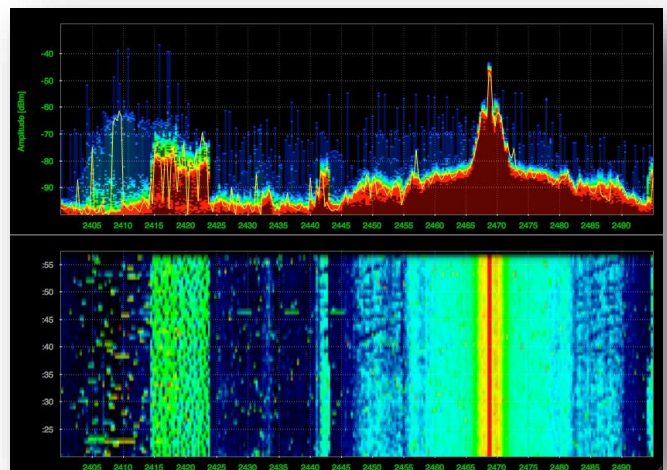
#### *Vergleichende Analyse verschiedener Verfahren zur Modellierung und Synthese von Gleislagefehlern und Bewertung ihrer Anwendbarkeit für Aufgaben der Fehlerdetektion und -isolation (FDI)*

Track irregularities are considered to be the major excitation of railway vehicles, playing a primary role in the dynamic response of the vehicle-track interaction system. The induced large oscillations and accelerations produce high wheel-rail contact forces, which in turn, are linked to wear of the infrastructure, damage and ride discomfort issues. Above a certain level of track irregularities, the operation of some vehicles will become unsafe and may even lead to derailment.

The importance of the determination of track irregularities is twofold: on one hand, it is necessary for classifying tracks into quality classes and for addressing supervision and maintenance tasks. On the other hand, regarding the design of railway vehicles, track irregularities have to be taken into account in the issues of running safety, ride comfort, dynamic loading and fatigue of components, etc. In operation, simulation scenarios can provide important insights regarding vehicle-track interaction.

*Von Vorteil sind Vorkenntnisse:*  
*Signalverarbeitung*  
*Programmierkenntnisse in Matlab und Latex*

The objective of this work is to perform a comparative analysis of several track irregularities modelling and synthesis strategies in order to state the advantages and disadvantages of each one of them. A conclusion about which one of these methods has the better performance compared with real data will be also stated. Additionally, the research looks to analyze which kind of information (features, residuals) about the track irregularities is possible to derive from the application of the different modelling approaches and its potential applicability for future Fault Detection and Isolation (FDI) tasks.



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