

Bachelorarbeit zu vergeben

Exploratory Analysis of Potentially Useful Features for Condition Monitoring (CM) and Fault Detection and Isolation (FDI) in Railway Tracks and Vehicles

Explorative Analyse potenzieller nützlichen Eigenschaften für Zustandsüberwachung und Fehlerdetektion und -isolation (FDI) in Gleisen und Schienenfahrzeugen

Condition Monitoring (CM) is a concept which describes the process of continuous supervision of the operating status of a system, in order to identify a significant change or variation, which could be a sign of a perturbed/degraded operation due to a developing fault. In this sense, CM is a subfield within the branch of Fault Detection and Isolation (FDI), which is applicable to systems that degrade in time and is aimed at detecting and identifying deterioration before it causes a failure. This is a key element of Condition-Based Maintenance.

The current and modern tendencies in the railway sector points to an increasing amount of electronics and control systems in railway vehicles, which is likely to facilitate the transition from passive to fully automatized systems. Advanced concepts for monitoring railway vehicle dynamics can provide real-time assessment of several characteristics of the suspension and the track interaction. This can be used to enhance safety, increase service reliability and availability and reduce the cost of maintenance by changing to a condition-based strategy.

*Von Vorteil sind Vorkenntnisse:
Signalverarbeitung, Maschinelles Lernen
Programmierkenntnisse in Matlab*

Earliest possible starting date for this topic is January 2021

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One of the main applications of this approach is the automatized assessment of track quality and the fault detection in the track-vehicle interaction system. For the task of track quality assessment, well-established features for evaluation are statistical measures about the track irregularities, including standard deviations, maximal and rms values. Some characteristics from spectral analysis in the frequency domain have also been used.

The focus of this work is to perform an extensive exploratory analysis on the potentially useful features for detecting and classifying faults in the track-vehicle interaction system. This includes the tasks of track quality assessment (considering the vehicle dynamics) and the detection of faults in the vehicle suspension.

