Master Thesis
Simulation-assisted analysis of the interaction between heavy-duty vehicles and modular roadway expansion joints

Motivation
Modular roadway expansion joints with integrated sensors are well suited for measuring the weights of crossing vehicles. Within a pilot study, this was proven by means of a setup with physically separated lanes.

Dynamic effects cause certain deviations of the measured values from the actual vehicle loads. These could be analyzed and can be compensated by studying actual measurement data and a multibody simulation model.

The simulation model has been recently expanded to represent an expansion joint spanning multiple lanes.

Tasks
Within the scope of this task, the extended simulation model shall be used to determine the influence of these dynamic effects on a multi-lane setup. Also, an approach to separate the measurement signals by lane should be developed in order to correctly assign detected vehicles to their respective lanes.

- Perform and evaluate virtual test drives with the given simulation model
- If relevant, modify the simulation model to account for different configurations of expansion joint and vehicle
- Adapt existing evaluation algorithms to evaluate the vehicle influence respective of lane
- Assess the reliability of detection and classification of vehicles

Requirements
- Experience with Matlab (or GNU Octave), Python
- Interest in numeric simulation of technical systems

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