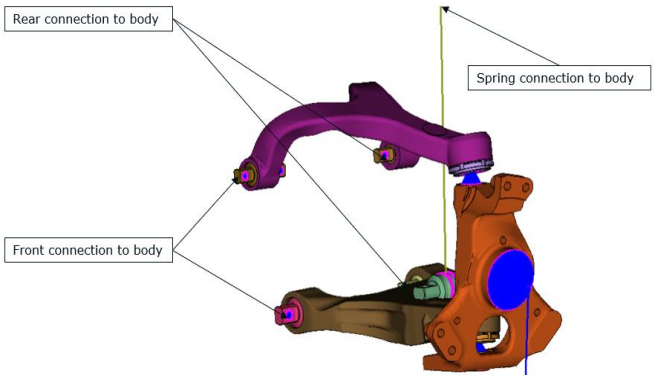
Technische Universität Graz
Erzherzog-Johann-Universität

Master Thesis/ Masterarbeit

Wheel suspension (front and rear axis with identical suspension)



We are awarding a diploma thesis with the topic:

INVESTIGATION OF AN ALL-WHEEL STEERING SYSTEM FOR A BATTERY TRUCK WITH INDEPENDENT WHEEL SUSPENSION BASED ON MULTIBODY SYSTEM SIMULATION

Company Rosenbauer developed a new battery driven fire truck, whereby two electrical motors drive front and rear axle independently. Furthermore, the vehicle consists of independent suspensions for all four wheels, whereby the front axle and rear axle suspensions are identical. The vehicle is equipped with a conventional front wheel steering system. Currently, the rear axle can be steered during reversing maneuvers. However, this rear axle steering system indicates potential also to improve the vehicle dynamic behavior (handling) for maneuvers like cornering, double lane change, etc.)

Current Status:

- Adams model of existing battery driven fire truck already exists, whereby parameters are based on estimations.

Thesis Part 1:

- Parameters to be checked and set up accurately (masses, moments of inertia, tire parameters, etc.)
- Definition and investigation of several driving maneuvers with front-wheel steering system.
- Driver model already exists, however fine tuning of parameters necessary for specific maneuvers.

Thesis Part 2:

- Company Rosenbauer measures vehicle with conventional steering system in the field (e.g.; St. Valentin)
- Measurement results to be postprocessed and analyzed (software programs already available).
- Fine tuning of MBS model parameters, especially tire and damper parameters, to meet measurement results.

Thesis Part 3:

- Extension of existing model by all-wheel steering system at rear axle.
- Parameter variations (e.g., ratio between rear and front steering angle) to identify potential of an all-wheel steering system and to optimize the dynamic behavior (handling) of the vehicle. Maybe additional control parameters to be introduced (e.g., adaptive damping control).

Requirements:

- Excellence in mechanics and mathematics
- Basic skills in multibody systems (preferably Adams)
- Capability to work independently.

Duration: rd. 6-8 months
Start: September 2024
Location: AVL List GmbH / location Tech Center **Steyr** and TU Graz

Successful completion will be rewarded with a single gross payment of EUR 3.500.

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25.6.2024

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