# Iterative optimisation study of hardpoints using Simcenter Motion

We are looking for motivated master students Engineering Technology

## Project description:

Formula Electric Belgium (**FEB**) is a team of highly motivated engineering students that build an electric formula student race car. Just like Formula 1 the team builds a brand-new car each year to compete in multiple international competitions during the race season. Formula Student is the largest international engineering and design competition in the world. The competition is characterized by combustion vehicles, electric vehicles and since recently also autonomous vehicles. Formula Electric Belgium strives towards innovations and the raw performance of technologies. It is for this reason that the team will focus on the autonomous/electric race cars. Research and development applications will be made by postgraduate students in collaboration with thesis students from the KU Leuven and bachelor students from Thomas More.

## Thesis description:

This year, we developed a Simcenter Motion model of the car. The location of the hardpoints is not only crucial for decent kinematic behaviour of the suspension, but also determines the forces in the a-arms as a result of acceleration, braking and steering manoeuvres. These are however hard to optimise manually, as a lot of hand calculations or simulations are necessary. The points need to be adjusted in a certain way so that the kinematics are not influenced by the adjustments made, but still there are an infinite number of solutions depending on the priorities of your choice. This means that a lot of calculations or simulations are necessary, and trade-offs need to be made. Simcenter Motion can quickly calculate these forces for different dynamic scenario's, and through an iterative scheme, these can be optimised.
These iterations could be done using Simcenter Heeds, performing iterations of different solutions, constantly varying predefined parameters within a certain range, or within other constraints. It allows you to visualise all of the different solutions, and a final design choice can be made based on these.

## Thesis objective:

Set-up a simulation scheme that is able to simulate the parameters within the correct constraints. Decide on which dynamic situation(s) should be considered, and how they will be simulated. Finally, choose and argument a single solution, combining the different options presented by the simulations.

## Profile:

- Interested in vehicle dynamics
- Can work iteratively
- Creative
- Teamplayer

## What do you gain?

- A unique engineering– and team experience where hard work and team atmosphere are central.
- Work with innovative technologies in a realistic environment/application.
- Create added value for your curriculum and the team

Are you interested? Please send your resume with accompanying motivation to:
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