Master Thesis about „Automatized Shape-Optimization in Computational Fluid Dynamics"

Over 100 years of experience in vehicle production and a broad range of services make **Magna Steyr** the worldwide leading brand-independent engineering and manufacturing partner for OEMs. So far, Magna Steyr has produced more than 3.5 million vehicles - of 29 different models. As part of Magna International, an international company with nearly 450 locations worldwide, we offer a diverse work environment with development opportunities worldwide.

THE JOB WITH THE BEST STANDARD EQUIPMENT

You are about to finish your studies and want to write a **practice-oriented master thesis** in the field of complete vehicle development?

We give you the possibility to deal with the topic of the (semi-) automatized shape-optimization based on the results from the computational fluid dynamics (CFD).

Your Tasks

Based on the current development in the automotive industry, like the introduction of a new procedure for determining pollutants, CO_2 emissions and energy consumption of cars (WLTP) and the arrival of electric vehicles on the market, aerodynamics gain a lot of attention in the development of new cars.

From about 60kph, aerodynamics are the dominating drag factor. A reduction of the aerodynamic drag results in a strong decrease of energy consumption and emissions. That's why the aerodynamic forced shape optimization of the vehicle geometry plays a major role in the future development of cars.

The aim of this thesis is to develop a process for a (semi-) automatized shape-optimization of the flow around a body or pipe flow in the automotive industry. These optimization methods are based on the results from CFD calculations. The process should contain the complete sequence from calculating the sensitivities, (automatized) shape-optimization and export of new surfaces for design departure.

Starting from a primary simulation, the result of the process should be an aerodynamics forced (semi-) automated design-optimization. The adjoint solver which is implemented in STAR-CCM+ software package will be provided.

Complexity of Design Optimisation
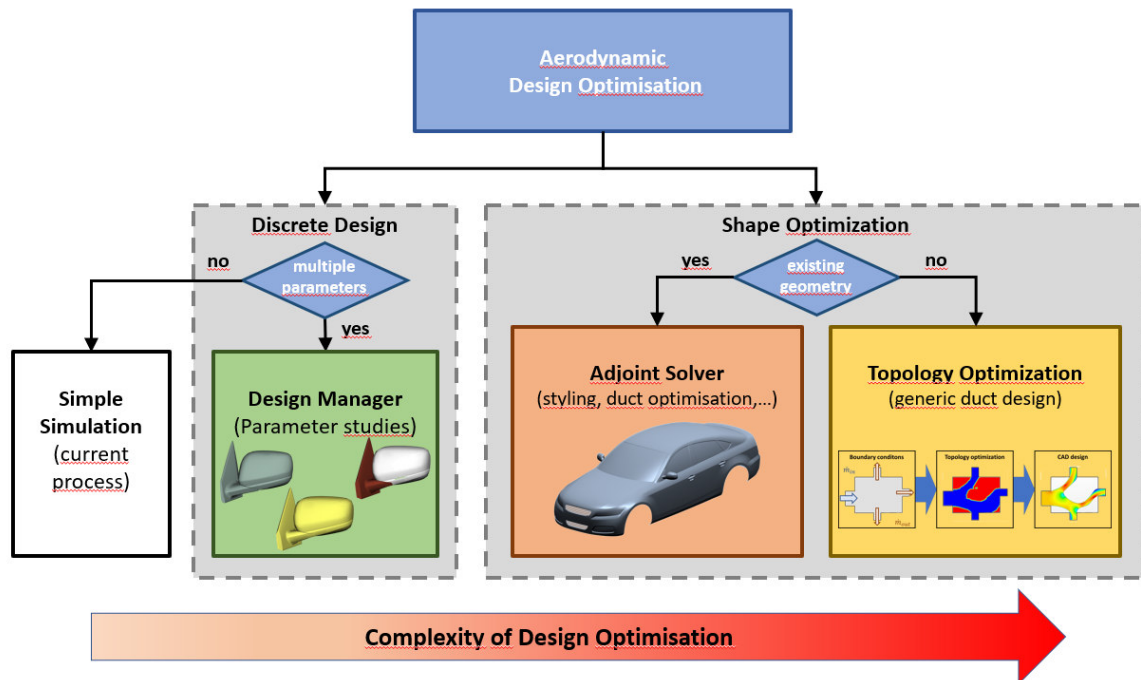
The following scopes should therefore be included in your master thesis:
- Creation of a market overview for available optimization tools in the field of CFD
- Research of the theory behind the adjoint solver
- Creation of a simplified model case (for example Ahmed body)
- Advancement of the simplified case towards a fully detailed production car process
- Development of an efficient post-processing guideline
- Documentation of all work done including conclusion and recommendation

Your Profile

- Ongoing technical study at the university / university of applied sciences
- First experiences through internships and study projects would be beneficial
- Basics in automotive aerodynamics
- Knowledge & experience in the field of CFD
- Basics in *Siemens STAR-CCM+* is advantageous but not necessary

Our Offer

The planned duration of the research and writing process is about 6 months.

Payment: € 700,00 gross per month

If you are interested in taking this opportunity, please apply online.

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