

Proposal for Master's thesis project

Background

Electric vehicles are becoming a crucial product of the automobile industry. It is well known that the ambient temperature is a very important player in the range of an electric vehicle. At low ambient temperatures, cabin heating is usually used to heat up the cabin for better passenger comfort and this is an energy intensive process which reduces the range significantly. Hence, being able to accurately predict air flow patterns and temperature in the cabin while aimed to increase the thermal comfort of passenger in the cabin is essential. For this purpose, robust CFD models need to be developed.

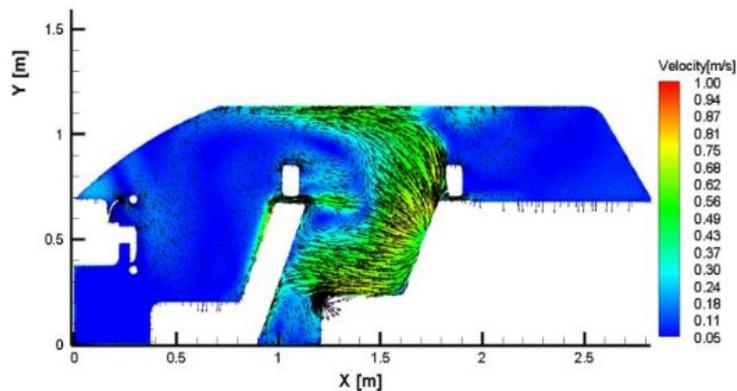


Fig. 1: Velocity field from a CFD simulation of a simplified cabin [DOI: doi.org/10.1051/e3sconf/20183201018]

Objectives and scope

The thesis aims to build a 3D CFD-1D method of a car cabin and analyze heat loss from it. The thesis can be divided into two parts:

1. Build a simplified CFD model of a passenger car cabin and study the amount of heat lost under driving and standstill conditions at different ambient temperatures.
2. Use the knowledge gained to create a workflow that couples 3D geometry to 1D GT Tai-Therm.

Pre-requisites:

1. The student should have good knowledge in fluid dynamics and heat transfer. Some experience in CFD is an asset (the software Star-CCM+ will be used).
2. Good programming skills will be considered a plus.
3. Highly motivated students with an interest in the automotive industry.

Duration:

1. The duration of the thesis is 20 weeks (30 ECTS)
2. The thesis will start around the 3rd week of January 2022.
3. Number of students: 1 student.

How to apply:

Apply with your CV, transcripts, and a short personal letter.

For more questions about the thesis, please contact:

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