

Aerodynamic Optimization of a Formula-E Racing Car

Internship proposal Master 2 - spring 2017

Inria Sophia Antipolis-Méditerranée

Acumes Project-Team

Context

Acumes Team at Inria Sophia Antipolis-Méditerranée (<https://team.inria.fr/acumes>) is starting a collaboration with Venturi Racing Team (<http://www.v-group.fr>), whose objective is the optimization of a racing car in the context of the Formula-E world championship (electric vehicles).

As first step, we will consider the aerodynamic optimization of the cooling system, which is a critical device for the efficiency of both the batteries and the electric engine. In this perspective, the optimization of the shape of the cooling duct is targeted, on the basis of aerodynamic criteria such as homogenization of the flow or maximization of the flow rate with constraint regarding the drag.



Description

The trainee will be in charge of the entire optimization procedure, from the mesh generation based on CAD data, flow analysis using a parallel compressible Navier-Stokes solver, to the optimization using a surrogate-based algorithm. The numerical methods and related software implied in the study are developed by the research team for several years. Therefore, the internship proposal is to adapt the existing numerical tools to the specific context and lead the simulation and optimization studies, with the challenge to output feasible optimized solutions that outperform the current configuration. The computations and the validation stages will be achieved in strong interaction with both the Inria research team and Venturi racing team.

Profile

- Master 2 or Engineer level in scientific computing
- Experience in Computational Fluid Dynamics required
- Experience in mesh generation, CAD, optimization would be appreciated
- Basic skills in programming (C/C++)

Practicalities

- Salary net per month: about 1195€
- Duration: 6 months
- Location: Inria Sophia Antipolis-Méditerranée research center

Contacts

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