

Fluid optimisation workflows for highly effective automotive development processes

Motivation and Objectives

- FlowHead aims to develop fast gradient-based optimisation methods using adjoint sensitivity analysis for automotive design. The key steps are
- developing and enhancing a range of adjoint solvers, including commercially licensed solvers, open source solvers and research codes
- developing automated shape parametrisation methods to deliver sensitivities for the complete design chain
- develop topology optimisation methods for industrial applications
- to integrate the optimisation tools into the design workbench and the product development process.

Project Plan, Milestones and Deliverables

The project runs for 3 years from Feb. 2009 to Jan 2012. Key milestones are:

M6: Partners receive first versions of adjoint sensitivity codes

M12: Concepts completed for CAD and DMU data-based design space definition and Manufacturing constraints

M24: Integration of the optimisation workflows into the PDP completed

M30: Software implementation and integration completed

M36: Evaluation and benchmarking completed

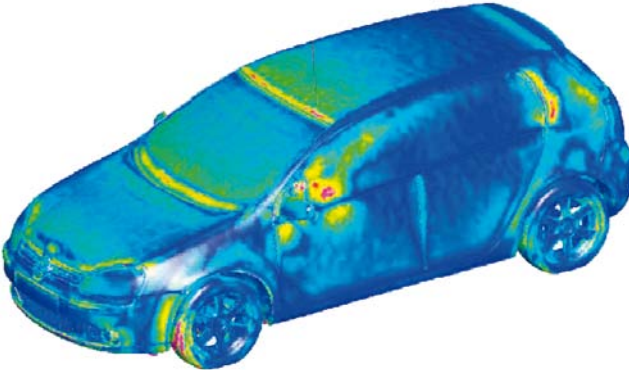
Technical Approach

- Development of adjoint flow solvers for fast gradient-based optimisation
- Large scale shape optimisation using adjoint sensitivities
- Industrial application of topology optimisation
- Integration of fast gradient-based optimisation tools into an industry standard workbench environment
- Linking of the optimisation workbench into the Product Development and Management (PDM) environment.

Achievements

The Project has recently had its 6M meeting, key deliverables met so far are:

- delivery of adjoint codes to partners for integration in their design chains
- definition of interfaces between workflow and PDP/DMU
- definition of workflow conception and modular interfaces



Organisational Information

Budget	3.2 M€	Funding	3.2 M€
Duration	36 months	Start	February 2009
DG	Research	Priority Area	Transport
Coordinator	Jens-Dominik Müller, QMUL	Contact	j.mueller@qmul.ac.uk
Partners	11 partners among them RENAULT, VW, ESI, CD-Adapco, FE-Design		
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