

Numerical simulation of wind induced noise in automobile engineering

Relevance to the Automotive Industry:	Over the last years acoustics have become a key aspect in automobile design. Numerical simulations play an important role within this field as they predict the behavior of components prior to their production.	
Research Location:	TUD Graduate School of Computational Engineering	VT
Homepage (Engl.):	http://www.graduate-school-ce.de	
Faculty Mentor:	Prof. Dr. Michael Schäfer	
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Graduate Mentor:	Dipl.-Math. Stephen Sachs Yu Du, M.Sc.	
Graduate Mentor Email:	sachs@gsc.tu-darmstadt.de duly@gsc.tu-darmstadt.de	
Project Description: Jun 1 - Jul 29, 2009; (8 weeks, 40h/week)	<p>The goal of this project is simulate the airflow around a top-mounted automobile antenna as well as the antenna itself (Fluid-Structure-Interaction) and investigate its behavior with respect to the emergence of noise.</p> <p>The student will work at the Graduate School of Computational Engineering at the TUD. The project will be conducted in close collaboration with the mentors and communication on a daily basis.</p> <p>After an introduction to the software the student will start with a two week reading phase to gain the necessary fundamentals in fluid and structural mechanics.</p> <p>Following to that phase, the student will build a CAD model of a reduced car model and antenna. This model will then be used for further computations.</p> <p>The commercial software package ANSYS is applied in this project. The fluid field around the antenna is simulated by ANSYS CFX, while the antenna is modeled with ANSYS Mechanical. Then both of them are coupled to form the Fluid-Structure-Interaction simulation, in which no third-party interface is required.</p>	
Necessary Skills/ Knowledge:	<ul style="list-style-type: none"> • Basic knowledge in CAD 	
Desirable Skills/ Knowledge:	<ul style="list-style-type: none"> • Interest in Fluid and/or Structural Mechanics and Numerical Analysis 	
Additional Online Resource:		

NSF REU Students must have completed at least two semesters of engineering studies prior to the proposed summer research, and they must have at least one semester remaining before they can earn their BS in Engineering.