Opleiding Werktuigbouwkunde

Universiteit Twente
de ondernemende universiteit

COLLOQUIUM

Conform artikel 4.6.8 van het SSNS-wb.

Vakgroep: **Technische Stromingsleer**

In het kader van zijn doctoraalopdracht zal

Remco M. Hartkamp

een voordracht houden getiteld:

Optimization of Airfoils in Inviscid Transonic Flow using Discrete Adjoints

Datum: vrijdag 17 April 2009

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Short summary:
The performance of amongst others airplanes, wind turbines, centrifugal pump and sports cars depends to a large extent on the functioning of wing-like parts. Shape optimization is often employed to achieve certain design objectives by modifying the shape of an object.
In this study a tool has been developed for the optimization of the shape of airfoils in steady, inviscid, transonic flow. These two-dimensional geometries are modified in such a way that for a given flow condition the drag force is minimized subject to a specified lift force.
One approach is to use gradient-based optimization, which requires the computation of gradients of the objective functions. Discrete adjoints provide a very efficient way to calculate these gradients.
In order to carry out the optimization process, the solution of the Euler equations for inviscid flow, is obtained on a structured grid around the airfoil. Subsequently, the discrete adjoint method is used for computing the gradients. Finally a gradient-based optimization algorithm determines a new shape of the airfoil and the process is repeated until the shape that has the lowest drag is obtained.

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