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

Mark van der Wiel

een voordracht houden getiteld:

Boundary Integral Method for Motion of Deformable Drops

Datum: vrijdag 25 september 2009

Tijd: 14.00 uur

Zaal: ZH 286

Summary:
The tracking of drops within another liquid and the determination of their shape in a three-dimensional flow is considered. It is assumed that the flow is governed by the Stokes equations for low-Reynolds-number flows. The numerical solution of the Stokes equations discretized in three-dimensional space requires much computational time. Therefore the solution is obtained employing the boundary-integral formulation of the solution of the Stokes equations in three-dimensional space.
In the boundary-integral formulation the solution is obtained by considering the boundary of the drops only. By tracking the boundary it is possible to determine the motion of the liquid in the drop. The Boundary Integral Method uses distributions of fundamental solutions of the Stokes equations on the interface between the drops and the surrounding liquid. The singular behavior of these solutions requires attention, as well as the jump relations of the solution across the interface.
To complete the method the conditions at the interface have been derived. The method provides the velocity distribution at the interface of the drop, which is used to determine the position of the interface as it deforms in time.
For the discretization of the integral formulation the integral equations were formulated for triangles and evaluated for a discretized surface of a refined-icosahedron. In order to make the tracking of the interface in time possible a complete solution routine has been implemented in Matlab. In order to test this method the conservation principles were formulated and two test cases defined.

Examencommissie:

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