



COLLOQUIUM

Conform artikel 4.6.8 van het SSNS-wb.

Vakgroep: Technische Stromingsleer

In het kader van zijn doctoraalopdracht zal

Dirk van Eijkeren

een voordracht houden getiteld:

Multi-Level Wave-Ray Approach for Solving Highly Indefinite 2D-Helmholtz Equation

Datum: vrijdag 19 december 2008

Tijd: 14.00 h

Zaal: HR C101

Summary:

The Helmholtz equation for standing wave solutions plays an important role in linear acoustics. The solution of the equation is often considered on semi-infinite domains subjected to radiation boundary conditions. This highly indefinite case has solutions with a large number of wave periods. Solving this problem numerically requires a high number of points to represent all wave periods accurately.

Iterative techniques are used to obtain a numerical solution, but these are computationally expensive for problems with a large number of points. Multi-Level algorithms greatly increase the performance of iterative techniques. Standard Multi-Level algorithms, however, do not work properly for the Helmholtz equation. A Wave-Ray algorithm not only restores the performance of the standard Multi-Level algorithm, it also facilitates naturally incorporation of the radiation boundary conditions. Separation of rays is required for the algorithm to work.

A Wave-Ray algorithm is produced for the non-homogeneous 1D-Helmholtz equation with using separation of Rays. Results show a major increase in performance with respect to standard techniques. For the 2D case a separation scheme is produced for eight ray-directions, and is implemented in a Wave-Ray algorithm.

Examencommissie:

De afstudeerdocent,

Prof. dr. ir. H.W.M. Hoeijmakers

(afstudeerdocent)

Dr. ir. C.H. Venner

(mentor)

Dr. ir. Y. Wijnant

Dr. ir. E.T.A. van der Weide

Ir. M.T. van Zoelen

d.d. _____