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Vakgroep: **Technische Stromingsleer**

In het kader van zijn doctoraalopdracht zal

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een voordracht houden getiteld:

Multilevel methods for linearized Euler equations

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Samenvatting:
In collaboration with TNO the Engineering Fluid Dynamics group has developed a Computational Aero Acoustics method. The method consists of three parts. First a Reynolds averaged Navier-Stokes calculation is carried out to compute the time-averaged flow field. Secondly, data produced by this computation is used to define the acoustic sources in the flow. Thirdly, the Linearized Euler Equations are used to compute the propagation of sound, emanating from these sources, through an inhomogeneous flow field. In the numerical simulation method, developed for this propagation part, an explicit time discretization is used. The advantages of the use of an explicit method in time are the predictable stability, its simplicity and the low memory requirements. With an explicit scheme the permissible time step is directly linked to the element size of the grid through the numerical stability criterion. In numerical simulations with fine meshes, the stability criterion leads to a very small time step. However, the time scales in the propagation of sound are much larger. Therefore, such a small time step may not be necessary for the accuracy of the solution and leads to excessive computing times. One way to reduce the required computing time is to use more advanced numerical algorithms. In this thesis the feasibility of the application of Multilevel techniques was examined. As a first step a literature survey was carried out to determine the state of the art of the Multigrid/Multilevel techniques for the solution of the Euler and linearized Euler equations. This has revealed several promising algorithms. Subsequently, the potential of the frozen τ algorithm in combination with the discontinuous Galerkin discretization has been investigated.

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