



Vortrag



High-order large eddy simulations using a spectral vanishing viscosity technique

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The Spectral Vanishing Viscosity (SVV) method, first developed for Fourier or Legendre spectral discretizations of conservation laws [1], has recently appeared of interest for the Large Eddy Simulation (LES) of turbulent flows [2, 3]. High frequency dissipation terms appear in the momentum equations and result from a matrix form of the SVV stabilization operator. The SVV is shown to lead to stable discretizations without sacrificing the formal accuracy, i.e., exponential convergence, in the proposed discretization. SVV-stabilized LES computations will be presented for two flows that emerged from a French-German collaboration on LES of Complex Flows, the rotating flow within a closed rotor-stator cavity at $Re=10^6$ and the flow over a generic car configuration (the Ahmed body, slant angle 25°) at $Re = 768000$.

[1] E. Tadmor, Convergence of spectral methods for nonlinear conservation laws, SIAM J. Numer. Anal., 26 (1), 30-44 (1989).

[2] Severac E. & Serre E, A Spectral Viscosity LES for the simulation of turbulent flows within rotating cavities, J. Comp. Phys. 226, (2), 1234-1255, 2007.

[3] Minguez M., Pasquetti R. & Serre E., Spectral vanishing viscosity stabilized LES of the Ahmed body turbulent wake, Comm. in Comp. Physics, 5(2-4), 635-648, 2008.

Termin: **Freitag, 5. Juni 2009, 11:10 - 12.40 Uhr**

Ort: **Raum ZEU 150a**

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