



Lehrstuhl für Strömungsmechanik & Strömungstechnik / Lehrstuhl für Systemtheorie und Regelungstechnik

Masterarbeit

Referenz-Nr.: LSS-M

"Kalman-filtered simulation for combining Particle Tracking Velocimetry and Direct Numerical Simulation"

Beginn:

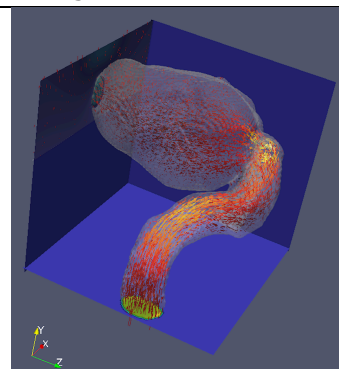
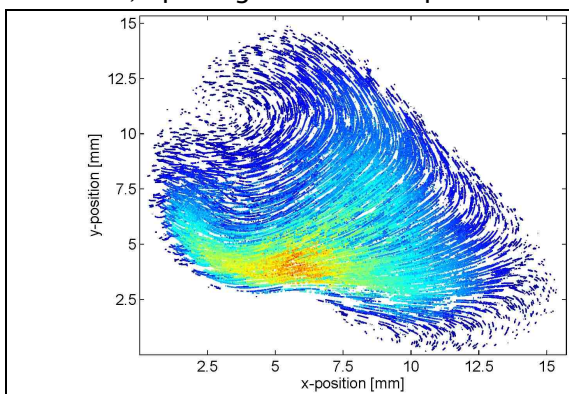
Abgabe

Ab sofort

Aufgabe

Particle Tracking Velocimetry (PTV) is a modern measurement technique allowing a Lagrangian (flow-based) analysis of complex configurations. Direct Numerical Simulation (DNS) is the most advanced simulation approach to investigate complex flows involving turbulence or transition. The group of Prof. Thévenin is one of the very few groups worldwide where both techniques are available and in daily use, in particular to analyze blood flows in aneurysms (see pictures, left for PTV, right for DNS).

In a recent publication, T. Suzuki¹ explained that both techniques can be coupled through a Kalman-filtered hybrid simulation in order to deliver even more robust information concerning complex flow features. The group of Prof. Findeisen is expert in such reduced-order, Kalman-based models. Through a tight collaboration between both groups, the findings of T. Suzuki shall be checked. The advantages obtained by combining PTV and DNS shall be quantified, together with possible difficulties and drawbacks, opening the door for possible improvements concerning this technique.



Gewünschte Qualifikation

- Studium der Ingenieurwissenschaften, idealerweise STK mit Vertiefungsrichtung Verfahrenstechnik
- Erste praktische Erfahrungen mit 3D-CFD-Software
- Eigeninitiative und Kreativität
- Verhandlungssichere Englischkenntnisse

Betreuung

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¹ T. Suzuki, J. Fluid Mech. 709:249-288 (2012): Reduced-order Kalman-filtered hybrid simulation combining particle tracking velocimetry and direct numerical simulation