SIMULATION-DRIVEN INNOVATION IN THE STRÖMUNGSRAUM® FRAMEWORK: FROM MATHEMATICAL MODELS TO INDUSTRY IMPACT

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ABSTRACT

The aim of this minisymposium is to showcase how cutting-edge mathematical simulations are driving innovation across various industries. It will highlight the synergy between numerical and scientific computing experts, software-, platform- and infrastructure providers as well as industry customers, demonstrating the transformative impact of advanced simulation- and AI models and optimizers. The StrömungsRaum® [1] platform, based on FEATFLOW [2] and OPENFOAM as central CFD simulation frameworks, combines IaaS, PaaS and SaaS service models and has a significant impact on business outcomes: Real-world case studies from industries like manufacturing and medicine will be showcased, demonstrating how simulation-driven cloud solutions have led to significant improvements in operational processes. A particular focus will be on how simulation cores are tailored to meet specific industry needs, turning complex data into actionable insights that provide direct competitive advantages.

The session will also address numerical and technical challenges, such as scaling computationally intensive simulations within SaaS architectures. Strategies for optimizing performance, including the use of high-performance computing (HPC) and cloud resources, will be discussed to enhance the speed and reliability of simulations. Here, we will also concentrate onto hardware-oriented approaches which are designed to exploit a much higher degree of massive parallelism and, particularly, the extreme computational efficiency of accelerator hardware, for instance GPUs from NVIDIA.

Moreover, the importance of collaborative development between academic institutions, SaaS providers, and industry partners will be highlighted. These collaborations are crucial for the continuous evolution of simulation technologies and their successful integration into market-ready SaaS solutions. The talks will provide insights into successful partnerships that drive innovation and support transformative changes across various industries.

REFERENCES

[1] Ianus Simulation. StrömungsRaum. https://ianus-simulation.de/stroemungsraum/ (Accessed: 24 September 2024).

[2] FEATFLOW. http://www.featflow.de (Accessed: 24 September 2024).