tries but emphasis will be put on the Slovenian cases. The applications cover the industry sectors of marine, constructions (HVAC), chemical, pharmaceutical, hydraulic, metal, power generation, among others. Each case presentation includes: (a) modelling targets, (b) description of the physical model, (c) results, (d) modelling conclusions.

source: SIMTEC



Hands-on training starting right after examples with Computational Fluid Dynamics: Express Introductory Training in ANSYS Fluent will include workshop Fluid Flow & Heat Transfer in a Mixing Tee, very typical in industry, that introduces the participant to ANSYS Fluent interface by tackling a simple closed turbulent singlephase flow with convective heat transfer, and presentation of Boundary Conditions and Solver Settings following by Turbulence Modelling, Heat Transfer & Transient Calculations.

The second workshop focuses more on the physics of the flow and its modelling with CFD, so each participant should choose one out of the offered three workshops, depending on her/his specific interests. Afternoon hands-on training in *High-Performance Computing with ANSYS Fluent will* feature an industrial case workshop with detailed documentation for

the participants to execute



6

source: SIMTEC

and experiment. The idea is that the setup, solution and post-processing will be finished in the first 1.5h and then we will have time to experiment with new solutions (e.g. changing BCs, material properties, mesh size, etc.) and of course to discuss and comment on best practices, error reduction and accuracy, tips and tricks, parallel computing efficiency, etc.

Friday, 27 September 2013

Computational Fluid Dynamics: Custom CFD codes and plugins

Presentation starts with High Performance Computing of gas turbine flows: current and future trends whereas in the afternoon hands-on training in *Multi-block structured code* (elsA) and an unstructured code (AVBP) will be used to test some of the requirements presented in the course (such as mesh-partitioning and load balancing) to achieve highscalability on massively parallel computer. Parallel computing strategies used with both flow solvers are detailed and compared. The second presentation RBF Morph theory and applications case-history in the morning introduces a unique morpher that combines a very accurate control of

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the geometrical parameters with an source: (rbf-morph)™

source: CERFACS

extremely fast mesh deformation, fully integrated in the CFD solving process. In the afternoon hands-on with RBF Morph performs on several cases, basic and advanced, covering both internal and external flows.

Prerequisites

Applicants are expected to have some experience with the topic of interest. School attendees will be selected based on applications submitted through the registration form, taking into account the order of registrations. Applicants will be informed about their acceptance not later than two weeks after their registration. The number of attendees is limited to about 40–50. All attendees are encouraged to bring a

poster on their work related to the topics of the school. The school is offered free of charge to industrial users, researchers and academics residing in PRACE member states and eligible countries. It is the responsibility of the attendees to arrange and cover travel and accommodation. Fakulteta za strojništvo je koordinator združenja PRACE za Slovenijo. V zadnjem tednu septembra 2013 organizira enotedenski tečaj industrijsko naravnanih simulacij z uporabo visokozmogljivih računskih sestavov (HPC). **Kotizacije ni!** Prijave so možne do zapolnitve sedežev.

WINKY DOK INKY

Tečaj je namenjen industrijskim uporabnikom doma in v tujini. Predvideno število vseh udeležencev je okoli 50. Po dosedanjih izkušnjah pričakujemo vsaj polovico tujih udeležencev. Domači uporabniki ne potrebujejo nastanitve v hotelih. Na posameznih predstavitvah in tečajih se lahko zgodi, da ne bodo polno zasedene. Domači udeleženci naj se prijavijo ter podrobno predstavijo interes udeležbe. Glede na prijavljeni razpored in temeljno zahtevo, da mora vsak udeleženec imeti popoln dostop do superračunalnika, bomo pripravili dinamično planiranje kapacitet, še posebej v delu, kjer bo interes večji. Obveščanje bo na spletni strani http://hpc.fs.uni-Ij.si/project/as13.

> Za dodatna pojasnila pokličite 01 4771716 ali pošljite elektronsko pošto na mateja.maffi@lecad.si.





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Industry Oriented HPC Simulations

Resolving Real Industrial Engineering Applications with HPC by ANSYS, optiSLang, AVBP, elsA, RBF Morph, etc.

23 – 27 September 2013 Ljubljana, Slovenia

The PRACE Autumn School communicates on and discusses issues and perspectives of HPC targeting industrial applications arising from evaluation performance and/or design of products, e.g. equipment and processes, with a particular emphasis on the automotive, aerospace, and energy fields. The school focuses on resolving real industrial engineering applications with HPC by ANSYS, optiSLang, AVBP, elsA, RBF Morph software in classes given by 12 lecturers (from CADFEM, SimTeC, CERFACS, ONERA, CINECA, University of Rome "Tor Vergata", ...) from the fields of Structural Mechanics, Computational Fluid Dynamics (CFD and BIO-CFD) and Electromagnetics (EM).



Aerial view of the Ljubljana old town. Photo: Tomo Jeseničnik, Tourism Ljubljana

Priority is given to algorithms, simulation strategies, and programming techniques for complex simulations, which usually have coupled multi-physics requiring intensive use of HPC resources. In case of expertise and software availability, there will be presentations of other issues, e.g. robustness and performance analysis, a brief introduction to pre- and post-processing techniques, e.g. CAD integration, mesh generation and visualization.

The PRACE Autumn School is targeted at (40-50) experienced industrial users and some academics. Case studies and hands-on tutorials will be carried on the ULFME cluster. The tutorials will be held in parallel and in subsequent sessions, depending on the applicants' interest indicated in the registration guestionnaire.

Programme

Monday, 23 September 2013

The school starts with the lecture HPC – the Perspective of a CFD Practitioner that will address the trends of the relation between CFD and HPC applications. After the lecture an overview Discover your design quicker than before with AN-SYS will present current technology, recent benchmark results from a

user perspective, as well as new ways of calculating large models and extensive design variations. As the leading CAE software vendor ANSYS enables parallel processing across all physics for solution of the toughest high-fidelity models, including more geometric detail, larger systems and more complex physics.

source: CADFEM

Afternoon hands-on training in Structural Mechanics: Best practices for efficient HPC performance with large models will explain how to setup ANSYS HPC and best practices for efficiently performing pre- / solve / and postprocessing of big structural mechanics models by Mesh controls for large model, How to cut analysis time and Evaluation of result.

Tuesday, 24 September 2013

Structural Mechanics: Robust Design Optimization - from the idea to the optimized product

A classic FEA simulation provides a result for a specific geometry, material and load configuration. In practice, however, most parameters are variable - there are different geometric

and material variations, different load conditions or variances that must be reflected in the simulation to understand products and production processes to be improved. On this day optiSLang inside ANSYS Workbench will be presented how to investigate a design space systematically to perform optimization with competing objectives and ensure the integrity of scattering influences. In addition to typical questions for robust parameter variation simultaneous solution through powerful high performance computing will be presented to save time. At the end procedures for the operation and organization of the results are presented.

Wednesday, 25 September 2013

Morning sessions starts with case studies in Electromechanics simulation overview (HFSS and Maxwel tools and numerical methods) following by Sail-

ing yachts CFD and BIO-CFD case-history where a wide range of haemodynamics CFD applications is presented (medical implantable devices, blood filters, multiscale-models. non-Newto-



source: CADEEM

processing in Fluent);

source: CINECA

(b) Intermediate modelling using Fluent for carotid bifurcation haemodynamics (unsteady BC in Fluent; non-

Newtonian custom models; multi-scale models coupling 3D and 0D in Fluent; customized post-processing).

Thursday, 26 September 2013

Examples of Solving Industrial Cases with ANSYS Fluent

Several industrial cases will be presented, executed by SimTec or its ANSYS software customers with the aid of ANSYS Fluent general-purpose 3D CFD package. The examples are taken from industrial applications in SE European coun-



SOURCE ANSVS

field effects like drives, actuators, sensors, signal and power transformers and their interaction in the overall system such as motion, heat and vibration. Comprehensive ANSYS simulation software offers capabilities for analysing all of these systems and effects. It allows users to detect imponderables early in the design process. enabling them to develop more innovative products and significantly shorten development time.

nian rheology,...) to perform in silico health-care re-

search and medical device design. Parallel hands-on

training in the afternoon is held in two computing classrooms depending on the interest in the following topics:

Multiphysics: Electromechani-

cal and Mechatronic Systems - Simulations are critical for the

successful development of complex mechatronic systems. The

function of these components

is based on the selective use of

BIO-CFD Tutorial

(a) Basic modelling using ANSYS Fluent for carotid bifurcation (GUI in Fluent for case setup from mesh import to first steady state, Newtonian simulation running; TUI and case journaling in Fluent for batch execution; post-







source: CINECA