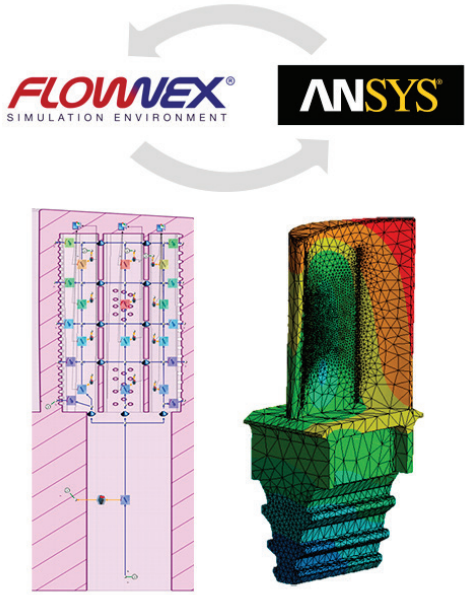
EnginSoft & ISimQ: Flownex Turbomachinery Symposium

1-D to 3-D CFD System Design for Turbomachinery

Lindner Hotel Airport
Unterrather Str. 108
40468 Düsseldorf

Tuesday 24th April



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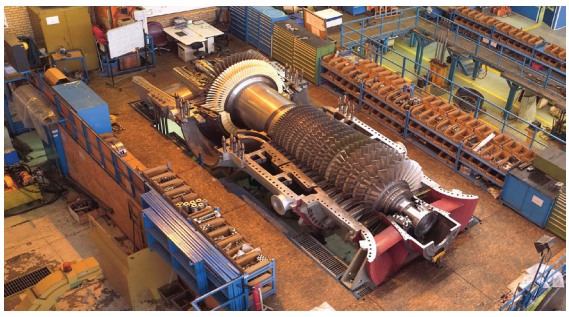

1D-CFD simulation focuses on the entire system rather than on the details of the continuum flow inside a specific component.
Individual system components are modelled using empirical laws or performance maps. The components are then combined in a network.
The workshop will discuss typical physical aspects of turbomachinery applications using the 1D-CFD system tool Flownex, and present examples, references and best practices as reported in the program.

1D System Design for Turbomachinery

Systems related to turbomachinery, from the smallest to the largest, must operate in many different scenarios and under different operational and often extreme conditions, such as emergency manoeuvres, pump tripping or valve movements.
Since it is not possible to test most systems before their installation, it is important to create the most reliable design in the early phase of the project. Simulations at a system level take from just a few seconds to a few minutes to run: it is possible to test hundreds or thousands of different configurations, different operation conditions and scenarios.

1D – 3D System Coupling

1D-CFD and 3D-CFD systems are not in competition. On the contrary, they should be viewed as complementary where components in the 1D network can be characterised using data coming from 3D-CFD simulations, and 1D-CFD simulations can be used to identify boundary conditions for 3D-CFD simulations. The information exchange between the software tools can be done using the ANSYS (Mechanical, CFX and Fluent) coupling link in Flownex.

AGENDA

- Introduction to Flownex
- Flownex application in turbomachinery (Basics, Benefits & Applications)
- Flownex applied in system integration (Pumping system, Gas and Steam turbine system)
- Flownex applied in the design of turbine engines (Combustor design, Secondary air systems, Blade cooling systems)
- Coupling of 1-D and 3-D Codes in ANSYS CFD (Basics, Benefits & Applications)
- From 1-D to 3-D, the Flownex coupling examples with ANSYS (CFX, Mechanical, Workbench)

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