framatome

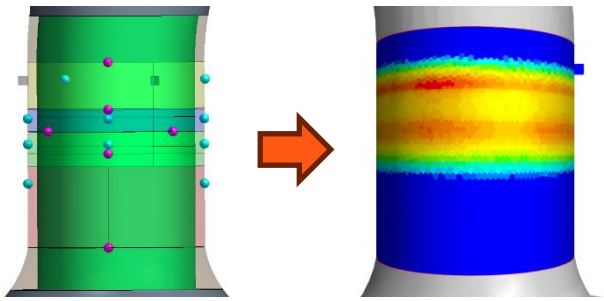
CFD Metamodels (Computational Fluid Dynamics)

Real-time prediction and computational time reduction using CFD metamodels

The CFD metamodels developed by Framatome enable the prediction of non-measurable quantities and a significant reduction in computational time

Challenge

- You must ensure the quality and performance of finished products
- You aim to accurately assess critical parameters (such as temperatures and cooling rates) that cannot be directly measured on-site
- You need to perform simulations tailored to the specific conditions experienced by the equipment
- You require fast simulations, but traditional CFD methods are too slow and complex for real-time applications
- You need to conduct sensitivity analyses to support design and safety studies

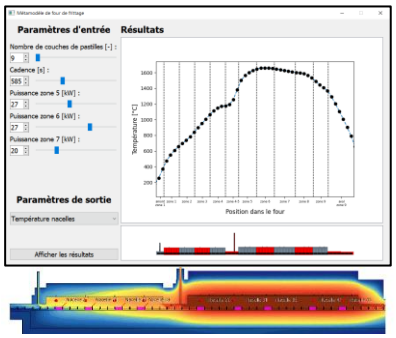


Prediction of the full temperature field based on measurements at a limited number of points during a heat treatment operation

Solution

Framatome offers an innovative solution to address these challenges:

- Development of CFD-based metamodels that deliver accurate, real-time results in seconds instead of hours
- Creation of intuitive human-machine interfaces for simplified user interaction and quick adoption
- Deployment on standard laptops, with no need for CFD licenses or high-performance computing clusters



Human-machine interface developed by Framatome

Customer benefits

- Significant reduction in computation time
- Real-time adaptation of simulations to each specific configuration
- Access to physical parameters that are not directly measurable
- Process optimization and improved product quality and performance

Key figures

A full transient CFD simulation completed in just a **few seconds** on a laptop, instead of several hours on **500** CPUs

References

- EDF
- Solution deployed in Framatome's manufacturing plants

Contact : cfd-calculations-dti@framatome.com
www.framatome.com