

Future and Emerging Mathematical Technologies in Europe

11 – 15 December 2017 Lorentz Center @ Oort

The workshop took place in the Lorentz Center on December 11-15, 2017. Unfortunately, due to extreme weather in Europe on December 10-12, several participants were not able to arrive to Leiden. Nevertheless, with a few minor adjustment the workshop had a full program as planned. Mathematicians from 15 European countries have participated in the workshop.

The primary objective of the meeting was to discuss success stories and share experience and best practices of organizing collaborative research projects with industry, as well as to discuss and brainstorm about joint future activities. One of the major obstacles we addressed is the low visibility of mathematical technologies in European programs. We had discussed at length the necessary measures to facilitate awareness about existing expertise in Europe and knowledge transfer.

On Wednesday afternoon, a special public session was held: four speakers from industry spoke about the mathematical challenges their facing.

Based on discussions during the workshop and the panel discussion on Wednesday afternoon, the following conclusions have been formulated:

- A complete industrial product or process in its whole life cycle can be accompanied by a virtual representation, often called digital twin that allows design optimization, process control, lifecycle management, predictive maintenance, risk analysis and many other features.
- In the present day situation, digital twinning is probably the most promising framework for comprehensive utilization of mathematical technologies.

Success in the development of the digital twinning technologies depends crucially on collaboration between academia and industry. Moreover, a special attention should be paid to generations of new algorithms and concepts combined with a focus on usability and transfer.

It has been decided that a working group, formed during the workshop, will investigate specific research opportunities in this area.

Participants evaluated highly the scope, program and organization of the workshop. In the opinion of organizers and the participants, the workshop was a big success.

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