

Mathematics in H2020

ICT Proposers' Day

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Welcome to the ICT Proposers' Day Information Session on Mathematics!

- The conclusions from our consultation on mathematics for H2020
- Why mathematics is important in proposals
- Messages from mathematicians to proposers

Consultations for Excellence in Science

●●●○ Proximus

18:54

ec.europa.eu

Consultations

In preparation of Work Programme 2018-2020.

FET Flagships

Share your ideas about grand Science and Technology Challenges for Europe.

FET Proactive

Share your ideas about new game-changing future technologies.

Mathematics

Inform the future work programmes with innovative mathematical content.

e-Infrastructures

Identify the key challenges of the future e-infrastructures.

Quick links

FET

Future and Emerging Technologies

Citizen Science

Science for the people, by the people

message, loud and clear, that mathematics have a lot to offer to science innovation. The response has exceeded expectations both in terms of quantity and in the quality of contributions received.

What are the challenges for tomorrow's e-infrastructure?

The process towards the third and last Horizon 2020 Work programme covering the period 2018-2020 has started, and we would like you to help us identify the challenges faced by the European e-infrastructure stakeholders. What are the key challenges? How to answer the increasing scientific demands? How can industrial actors fully benefit from the services provided by European e-...

Want to talk innovation? Check out the Innovation4EU debates!

Innovation is multi-flavoured. It can be digital, open, responsible, social or industrial, disruptive or data-driven. Innovation brings creativity and knowledge, it drives data and research. Innovation is everywhere. But where does Europe stand? How can we become more innovative in order to be more...

Why? Because...

- *The world has become very complex.*
- *Too many parameters*
- *Too much data*
- *... to make conclusions without help*

Mathematics is needed because...

- *Science has become data driven.*
- *Data needs analysing, and analysing needs mathematical tools and methods*

Why? Because...

- *The world has become very complex.*
- *Too many parameters*
- *Too much data*
- *... to make conclusions without help*

Mathematics is needed because...

- *Data crunching needs computing power, and computing, especially HPC, needs algorithms and mathematics.*
- *Quantum computing is mathematics*

Why? Because...

- *The world has become very complex.*
- *Too many parameters*
- *Too much data*
- *... to make conclusions without help*

Mathematics is needed because...

- *Problems and required models are more and more complex*
- *Solutions need to consider more and more parameters*
- *Also improbabilities need to be considered (look at twin towers)*
- *Online constant changes need to be built in*

The online consultation...

- was carried out between January and May 2016
- was complementary to the consultation and workshop on mathematics in 2014
- Wanted to identify **important existing and emerging mathematical domains**
- Looked for **potential** for H2020 WP2018-2020
 - New mathematical areas or ideas to consider
 - Mathematics to include into topics
- Identified potential also for H2020 WP2017 topics to consider mathematical participation

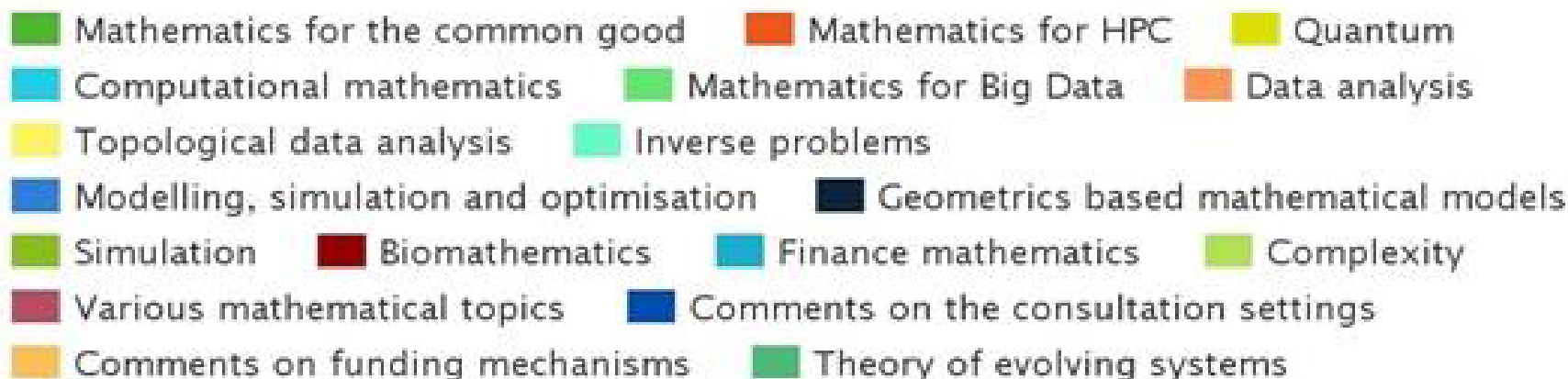
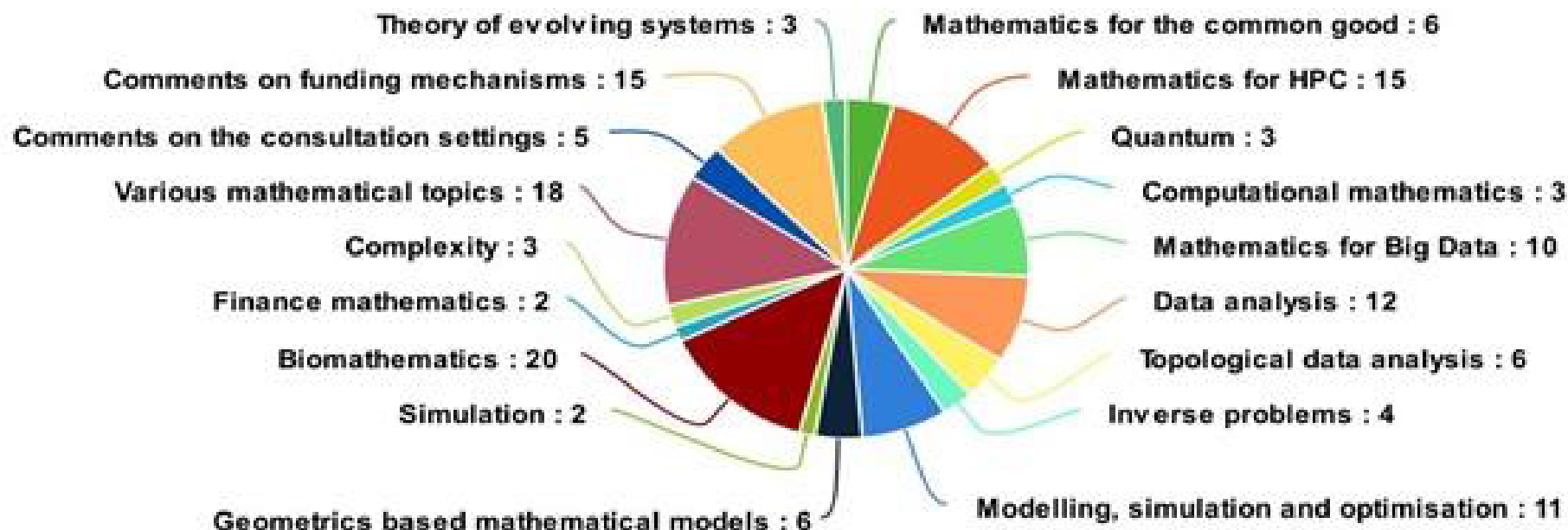
The Consultation was a success!

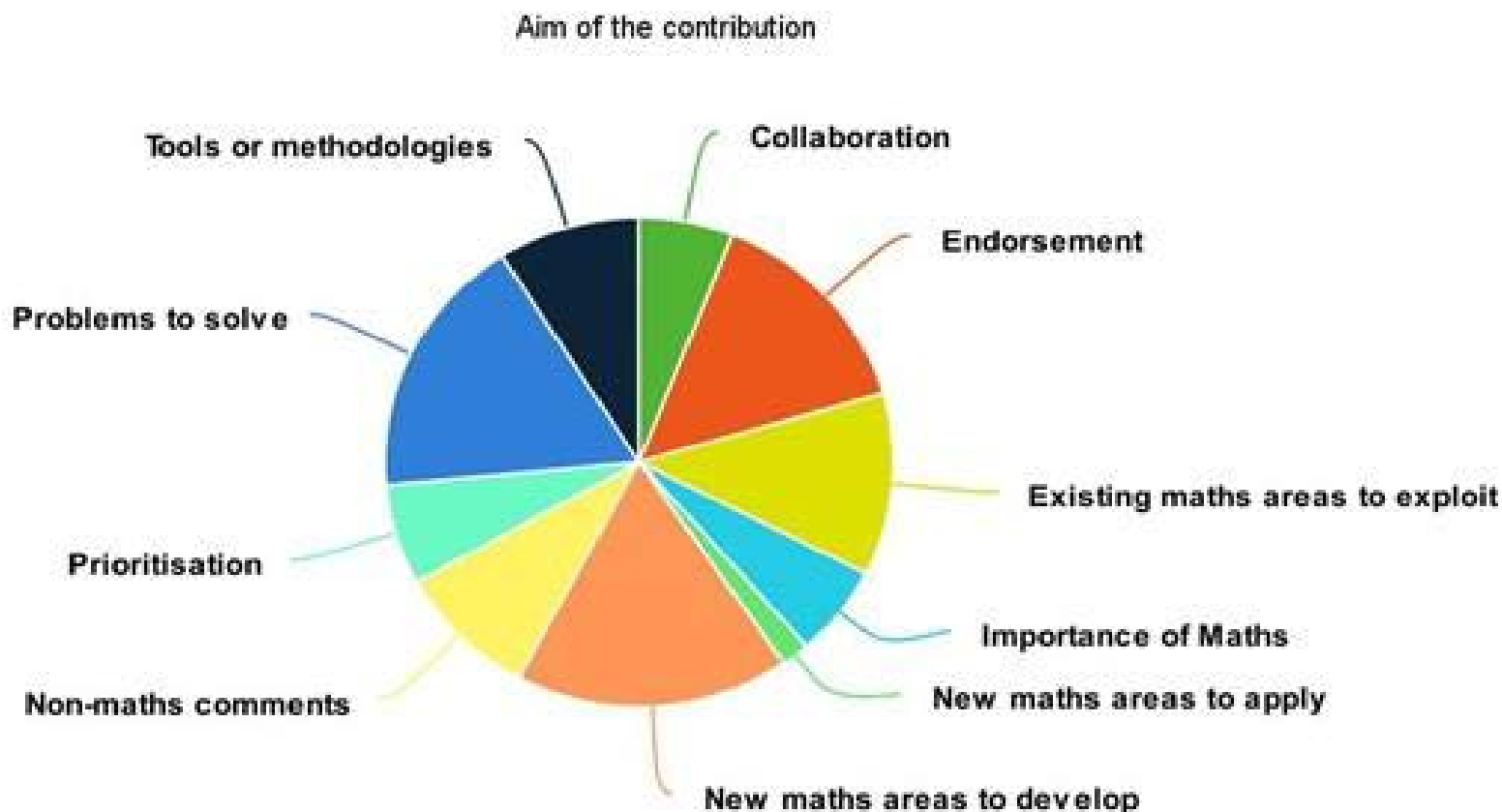
We received

- *181 responses*
- *from a wealth of mathematical disciplines*
- *from high level contributors*
- *the fields which are especially relevant to DG CONNECT were well present:*
 - Modelling, simulation and optimisation (MSO)
 - Biomathematics
 - Algorithms and optimization methodologies for HPC and computing
 - Various methodologies for data analytics

What topics were covered?

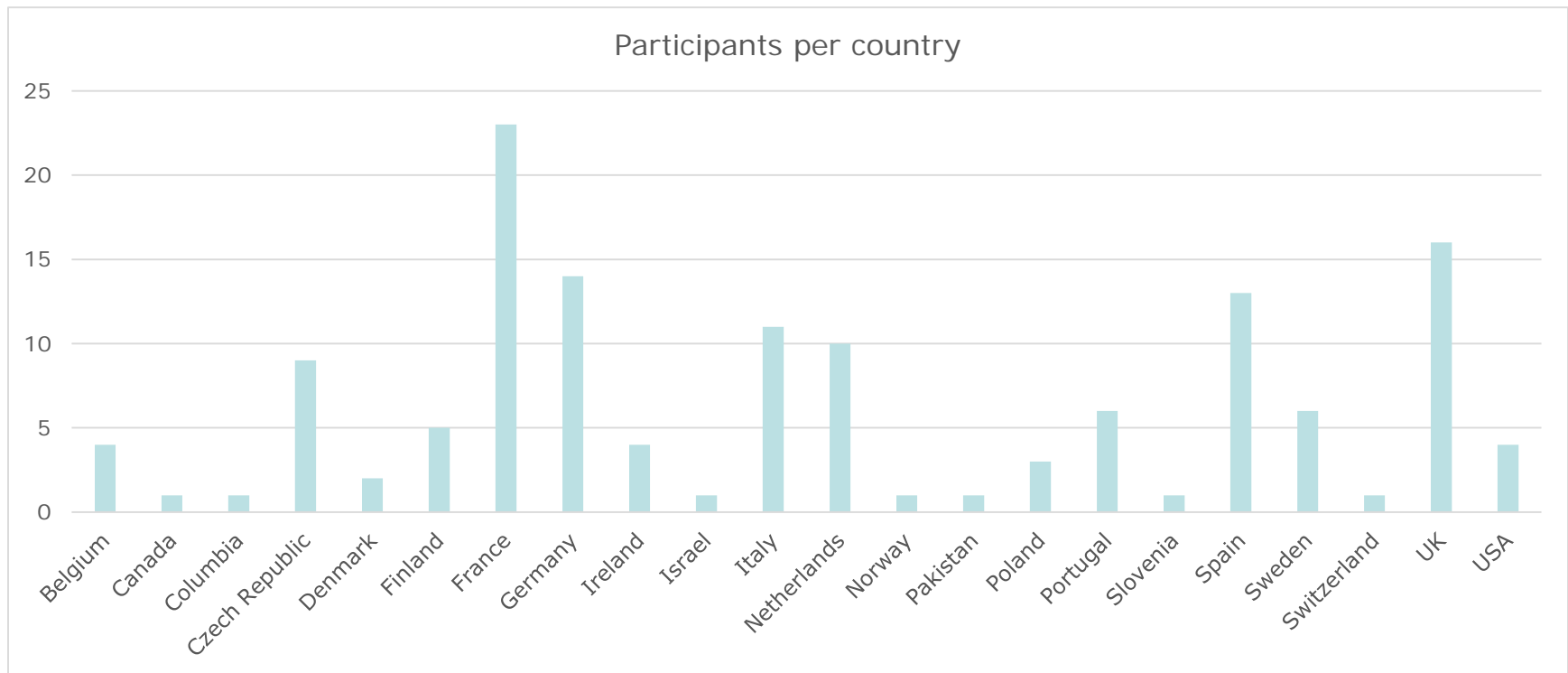
1. EXECUTIVE SUMMARY
2. BACKGROUND
3. MATHEMATICS IN EUROPE TODAY
4. COLLABORATION, CONVERGENCE AND INTERACTION
5. CHALLENGES TO TACKLE
6. MATHEMATICS FOR INDUSTRY AND INNOVATION
7. MATHEMATICS FOR HPC
8. QUANTUM
9. DATA ANALYSIS
10. MODELLING AND SIMULATION METHODOLOGIES
11. BIOMATHEMATICS
12. OTHER MATHEMATICAL AREAS
13. SUMMARY

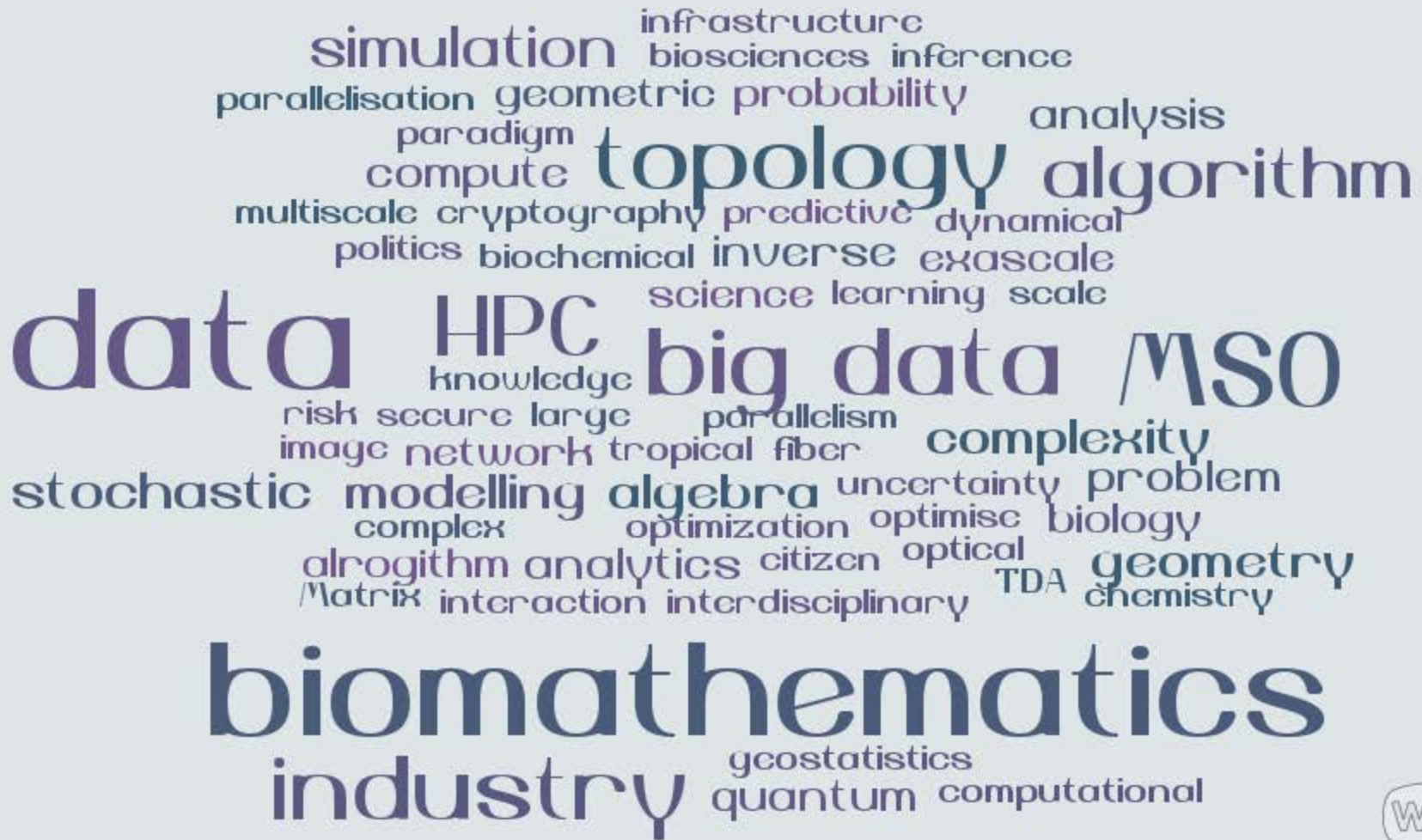




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|------------------------|--------------------------|---------------------------------|
| Collaboration | Endorsement | Existing maths areas to exploit |
| Importance of Maths | New maths areas to apply | New maths areas to develop |
| Non-maths comments | Prioritisation | Problems to solve |
| Tools or methodologies | | |

Countries of contributors





Conclusion from the Consultation

- There is **vast potential** in the mathematical world in Europe
- There is **relevance** for our WP topics
- Proposals will have **better quality** with mathematical participation
- We recommend **mathematicians to be active**
- We recommend **partners to talk with mathematicians**



FET

- FETHPC-02-2017: Transition to Exascale Computing Specific
- FETHPC-03-2017: Exascale HPC ecosystem development

ICT

- ICT-23-2017: Interfaces for accessibility
- ICT-31-2017: Micro- and nanoelectronics technologies

NANO

- NMBP-25-2017: Next generation system integrating tangible and intangible materials model components to support innovation in industry
- NMBP-35-2017: Innovative solutions for the conservation of 20th century cultural heritage

LEIT

- COMPET-3-2017: High speed data chain

Societal Challenges

- SC1-PM-15-2017: Personalised coaching for well-being and care of people as they age
- SC1-PM-16-2017: In-silico trials for developing and assessing biomedical products
- SC1-PM-17-2017: Personalised computer models and in-silico systems for well-being



Societal challenges

- LCE-06-2017: New knowledge and technologies
- LCE-01-2016-2017: Next generation innovative technologies enabling smart grids, storage and energy system integration with increasing share of renewables: distribution network
- MG-5.2-2017: Innovative ICT solutions for future logistics operations
- MG-5.4-2017: Potential of the Physical Internet
- ART-01-2017: ICT infrastructure to enable the transition towards road transport automation
- CO-CREATION-06-2017: Policy-development in the age of big data: data-driven policy-making, policy-modelling and policy-implementation
- DS-06-2017: Cryptography
- DS-07-2017: Addressing Advanced Cyber Security Threats and Threat Actors

FOF

- FOF-12-2017: ICT Innovation for Manufacturing SMEs (I4MS)



The report:

<https://ec.europa.eu/futurium/en/content/mathematics-europe-report-open-consultation>

THANK YOU!