

Programme for TSG21:

Mathematical applications and modelling in the teaching and learning of mathematics

The OT of TSG21 has accepted fifteen papers as contributions to our group. Below, you find the final versions of thirteen of these papers listed in the order they appear in the programme. The remaining two papers will be uploaded as soon as we have the final versions.

During our four TSG sessions the presentation and discussion of papers will be structured according to the following three themes:

1. Conceptualizations of mathematical modelling in different theoretical frameworks and for different purposes.
2. Cultural differences and the importance of international co-operation in research and development on the teaching and learning of mathematical modelling.
3. Design of curricular experiments and didactical reflections on the teaching of mathematical modelling.

For each theme there will be a short introduction, oral presentations of a few selected papers and a short general discussion to round off the theme. Papers introducing each of the three themes will be uploaded only shortly before the congress, intentionally on July 1.

The paper presentations will have the format of 15 minutes presentation followed by 5 minutes for questions. The presenters should assume that all participants have read the papers beforehand and the participants are urged to fulfil their part of this assumption and be prepared to discuss all the papers published on the web-page.

Monday, July 7, 13.00-14.00: Introduction and Theme 1

13.00-13.15 *Introduction to the programme for TSG21* (Morten Blomhøj and Susana Carreira)

13.15-13.35 *Introduction to theme 1*, Morten Blomhøj.

(A survey paper will be available at the TSG21 web-page before the congress.)

13.40-14.00 *Mathematical modelling, the socio-critical perspective and the reflexive discussion.*
Jonei Cerqueira Barbosa, Brazil

Wednesday, July 9, 12.30-14.00: Theme 1, continued

12.30-12.50 *Mathematical models in the context of sciences.*

Patricia Camarena Gallardo, Mexico

12.50-13.10 *Differential equations as a tool for mathematical modelling in physics and mathematics courses.*

Ruth Rodríguez Gallegos, France/Mexico

13.10-13.30 *On the development of mathematical modelling competencies – The PALMA longitudinal study.*

Rudolf vom Hofe & Alexander Jordan, Germany

13.30-13.50 *Reinforced bonds between modelling and reflecting.*

Mette Andresen, Denmark

13.50-14.00 *Closing discussion on theme 1.*

Friday, July 11, 12.30-13.30: Theme 2

- 12.30-12.50 *Introduction to theme 2.*
Thomas Lingefjärd, Sweden
(A survey paper will be available at the TSG21 web-page before the congress.)
- 12.50-13.10 *A comparative study on mathematical modelling competences with German and Chinese students.*
Matthias Ludwig, Germany & Binyan Xu, China
- 13.10-13.30 *Mathematical modelling in a European context – A European network-project.*
Stefanie Meier, Germany.

Saturday, July 12, 12.00-13.30: Conclusion of Theme 2 and Theme 3

- 12.00-12.15 *Closing discussion on theme 2.*
- 12.15-12.35 *Introduction to theme 3.*
Toshikazu Ikeda, Japan.
(A paper will be available at the TSG21 web-page before the congress).
- 12.35-12.55 *Formatting real data in mathematical modelling projects.*
Jussara de Loiola Araújo, Brazil
- 12.55-13.15 *Simple spreadsheet modelling by first-year business undergraduate students: Difficulties in the transition from real world problem statement to mathematical model.*
Djordje Kadijevich, Serbia
- 13.15-13.30 *Closing discussion on theme 3.*
What did we accomplish in TSG21? Closing remarks by Susana Carreira.

All the papers accepted for publication on the TSG21 web-page are organised according to their relations to the three themes. Supplementary to the papers presented orally and mentioned in the programme above the following papers will be published at the web-page:

Papers related to theme 1: *Conceptualizations of mathematical modelling in different theoretical frameworks and for different purposes.*

Applying mathematics: Metamatics or Mathematism?
Allan Tarp, Denmark

The teachers' tensions in the practice of mathematical modelling.
Andréia Maria Pereira de Oliveira & Jonei Cerqueira Barbosa, Brazil

Papers related to theme 2: *Cultural differences and the importance of international co-operation in research and development on the teaching and learning of mathematical modelling.*

No additional papers.

Papers related to theme 3: *Design of curricular experiments and didactical reflections on the teaching of mathematical modelling.*

Mathematical modelling: From classroom to the real world.
Denise Ferreira & Otavio R. Jacobini, Brazil

Prograph Diagrams - a new old system for teaching functional modelling.
Hans-Stefan Siller, Austria

Mathematical models in secondary Chilean education.
Maria Aravena Díaz & Carlos Caamaño Espinoza, Chile

Mathematical modelling and environmental education.
Ademir Donizeti Caldeira, Brazil