

## Working Group 5 – Applying Mathematics in Realistic Situations

Group Leaders: *Ivan Meznik & Enrica Lemut*

Seven papers have been presented and discussed out of the 9 announced and the 8 included in the Proceedings.

In particular:

in the first session :

Enrica Lemut (Italy) – Living in the Real-World-System: technology and mathematics as Systemic Thinking mediators

Ivan Meznik (Czech Republic) – A Consistency Qualitative Analysis of Complex Real-Life Models

in the second session :

F.Garcia, A.Fernandez, J.Barallo & L.Martin (Spain) – Colouring Dynamical Systems in the Complex Plane

B.Ferrucci (USA) – Mathematical Modelling, Technology, and the Environment

in the third session :

N.Sala (Switzerland) – Multimedia Technologies: A New Way to Analyse the Connections between the Mathematics, Architecture, and Arts

K.Rais (Czech Republic) – The Modelling of the Large Investment Projects – Problems, Limits and Solutions.

L.Lam (Hong Kong China) – Theory and Application of Majority Vote – From Condorcet Jury Theorem to Pattern Recognition

Almost all people presenting a contribution participated to all the Working Group sessions; also other people participated, especially to the first and second session.

From the presentations, two different conceptions of mathematics arose:

- mathematics as a tool in problem solving activities, both in schooling and professional situations
- mathematics as theoretical knowledge for mediating real-life-world understanding

Mathematical Modelling takes a central role in all presentations, even if from different points of view. Quantitative or qualitative mathematical models have been presented and discussed in different applications of mathematics to real-life-world handling.

Production, interpretation, use and discussion of mathematical models are considered as important aspects in the acquisition of mathematical modelling capabilities.

The main suggestion arisen from the workgroup activity concerns the importance of analysing not only specific mathematics application per se', but also:

- influence of new math applications on general educational aims
- influence of new technologies on general educational aims, with a particular attention to the relationship between modelling activities and new modelling tools
- different reasoning processes activated by the pupils/users, both working by themselves or assisted by a teacher/tutor
- role of the teacher and relationship between pupils, teachers, and tools as mediators of new knowledge acquisition and of specific ways of reasoning

A comment is due about the title of the Working Group.

The title can generate confusion about the focus of the conference, even if we can clarify what meaning we assign to the terms "Realistic Situations".

What is important: a) to extend the list of mathematics applications or b) to discuss which mathematics, important for applications, can be introduced at different schooling levels and how (methodologies, cultural obstacles, difficulties...)?

After the third session, a part of the group has had a further occasion to discuss about Working Group organisation. It emerged that it needs to clarify if we want to emphasise presentations and related specific discussions or general discussions about a certain group of presentations.

In the first case, we do not have an actual Working Group, but only a grouping of presentations according to some generic similarity in contents. In this case, coherently, people have to be facilitated to skip from one to another Group in order to give answers to their personal interests.

In the second case, presenters are assigned to a group in a fixed way; each of them is asked to read the presentations in her/his own session(s) and stimulate the discussion about eventual development and/or new application of what presented by her/his colleagues. It obviously implies that each presenter can have in her/his hands the papers written by the group-mates before the conference (it is not possible to do that during the conference). It is possible if all contributions are accessible via internet.