

Translations towards connected mathematics (Workshop)

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Abstract

This workshop is aimed at involving participants in a discussion about the role of mathematical connections of different types in mathematics, its teaching and learning. The discussion will be based on mathematical activity in which we will ask the participants to solve several problems from different fields of mathematics using translation principle. This connectionist approach will be compared with other didactical approaches from the perspective of their effectiveness for developing mathematical understanding, mathematical creativity and critical reasoning in pupils and their teachers.

Workshop summary

Mr. Smith is standing in front of the "Infinity hotel" – one that has infinite number of rooms. All the rooms in the hotel are occupied and none of the guests is planning to leave the hotel. How could the manager find a room for Mr. Smith in the hotel?

Developing mathematical understanding by means of connections is one of the main principles in mathematics education. One way to develop mathematical connection is solving a particular problem in different ways. The other way is applying the same strategy when solving problems from different branches of mathematics.

At the proposed workshop we plan to present the idea of using translation principle in solving mathematical problems from different fields. We will ask participants to solve problems from geometry, algebra, number theory and calculus in multiple ways one which is based on translations. This will help us to highlight different meanings of "translations" in mathematics. Regular solutions of the problems will be compared with those using translations.

We argue that teachers may use solutions of this type easily throughout school mathematical curriculum. This presents a perfect example of spiral development of curriculum centered on problem-solving approach. By doing this the teachers and designers can develop students' awareness of unifying principles in mathematics and of its connectedness. This way of teaching may be very effective to avoid compartmentalization of mathematical knowledge, develop students' creativity and flexibility of their mathematical thought.

We will ask participants to be active. The paper related to our workshop will be distributed at the conference after the problems will be solved in order to allow us presenting some surprising solutions and to involve the participants in authentic discussion related to translations towards connected mathematics.