

# The Language of Mathematics

Stancho Dimiev

*Institute of Mathematics and Informatics, of the Bulgarian Academy of Sciences  
Sofia 1113, Bulgaria  
University of Architecture, Civil Engineering and Geodesy, 1 Hristo Smirnenski Blvd.  
1046 Sofia, Bulgaria*

**Abstract.** This is a talk about general things in mathematics and physics without going into any special technical details. This is the beginning of the author's project which is to be developed in the next years. Here we collect and present only some well-known claims, opinions and observations.

**PACS:** 11.10.-z; 01.70.+w

## WORDS, SENTENCES, LANGUAGE

*Words are dangerous tool.*

*An well known sentence*

Usually one says that the mathematical language is a part of the ordinary language endowed with various mathematical signs (+, −, 0, =, ∈, dx, ...) together with well defined special objects as derivative, integral, logarithm, etc. This language differs from the language used in the everyday talk in which the meanings of the words and sentences often lose precision.

The mathematical thinking requires more sophisticated description. As the ordinary thinking governs our daily routines, the mathematical thinking is a form of universal reasoning, which penetrates through all sciences, and, of course, applies in its own specific area.

What does it mean 'to think mathematically'? And, what is the meaning of 'doing mathematics'? A simple answer is the following: it is to make computations and proofs! This answer, is given, I think, somewhere in Bourbaki, in view of the etymology of the ancient greek word 'mathematics'.

The so-called algebraic symbolism is a part of the mathematical language. It is used widely in the mathematical disciplines and provides the symbolic expressions of the physical laws. A simple example is given by the Galileo's discovery of the quadratic law for the falling bodies (in vacuum), namely the well known formula

$$h = \frac{1}{2}gt^2.$$

From here originates Galileo's enthusiastic claim that Nature admits a nice mathematica description full of clarity and simplicity. Three centuries later Ernst Mach points out that 'there is no procedure that leads more safely with mental economy to such a simple interpretation of all natural events'.