

**“WHAT IS MATHEMATICS?” -- AND WHY WE SHOULD ASK, WHERE ONE SHOULD
EXPERIENCE OR LEARN THAT, AND WHO CAN TEACH IT**

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“What is Mathematics?” (with a question mark!) is the title of a famous book by Courant and Robbins, first published in 1941, which does not answer the question. The question is, however, essential: The public image of the subject (of the science, and of the profession) is not only relevant for the support and funding it can get, but it is also crucial for the talent it manages to attract -- and thus ultimately determines what mathematics can achieve, as a science, as a part of human culture, but also as a substantial component of economy and technology.

“What does Doing Mathematics mean?” Is it realistic to say that anyone who teaches Mathematics should do that on the basis of a first-hand research experience in Mathematics? Weierstrass was a teacher for a number of years. Is he the teacher we want or need for the 21st Century high school education?

In this lecture we thus

- discuss the image of mathematics (where “image” might be taken literally!),
- sketch a multi-faceted answer to the question “What is Mathematics?,”
- try to give an equally multi-faceted answer to the question what “Doing Mathematics” might mean,
- stress the importance of learning “What is Mathematics” in view of Klein's “double discontinuity” in mathematics teacher education, as observed by Felix Klein in 1908,
- present the “Panorama project” as our response to this challenge,
- stress the importance of *telling stories* in addition to *teaching* mathematics, and finally
- suggest that the mathematics curricula at schools and at universities should correspondingly have space and time for at least three different subjects called Mathematics.

References

Courant, R., Robbins, H., (1996). *What is Mathematics? An Elementary Approach to Ideas and Methods*, Oxford UK: Oxford University Press. second edition.

Loos, A., Ziegler, G.M. (in press). *Panorama der Mathematik*. Springer Spektrum, Heidelberg.