FAIR research

In many European countries, e.g. Germany, there is a strong movement that all research data should be freely available according to the FAIR principles (findable, accessible, interoperable and reusable). See

https://libereurope.eu/wp-content/uploads/2017/12/LIBER-FAIR-Data.pdf

In principle, FAIR is a laudable goal that will improve the openness of science. Of course, this is a major challenge for scientists who produce massive data, e.g. from numerical simulations, or physical experiments. In addition, the way how data and standards are defined also poses some serious challenges for mathematical research as a whole, by including non-traditional forms of "data", such as mathematical formulas and theorems.

How and in which form can we standardize the way to find mathematical formulas or mathematical theorems, when different communities use different terminology for the same objects while the same formulas for different objects?

The German Science foundation DFG has just started a large call for building research data infrastructures to deal with this, see e.g.

https://www.dfg.de/en/service/press/press_releases/2018/press_release_no_58/index.html

Most people in the mathematical community seem to ignore these developments, but this may lead to real threats for the community if we do not join the movement right from the beginning.

Examples of such threats could be that standards will be fixed that are incompatible with our current way to produce mathematical

articles (in LATEX) and PDF, or that the way formulas are stored is just graphically. Another problem may be that standards for model generation, mathematical software, or simulation data that are cumbersome or impractical. It is clear that commercial code providers are heavily lobbying with governments to make standards that are good for them and that IT companies and data analytics people have their own views of how data should be addressed.

The mathematical community must unite in a common quest to be on board right away in the developments (the German math community has already decided to do this) and to make these principles realistic for mathematics and the neighbouring sciences and to preserve and improve established publishing standards like to be able to deal with the future developments. This may require also the construction of new and uniform concepts, such as semantic annotation of formulas or theorems.