

# MaRDI - The Mathematical Research Data Initiative within the German National Research Data Infrastructure (NFDI)

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Like in all scientific disciplines research data in mathematics has become vast, it is complex and multifaceted, and, through the successful application of mathematics in interdisciplinary research, it is widespread in the scientific landscape. It ranges from information bases such as the standard reference data for special functions, tables and similar mathematical objects to highly complex data in scientific computing or scientific machine learning. The growing amount of research data challenges an old requirement in science: its reproducibility and the re-usability of results. In an attempt to answer this challenge at current level, the FAIR principles have been formulated. Yet, despite the existence of special solutions a comprehensive infrastructure for research data in science or in mathematics is missing that supports the research process and implement the FAIR principles. Thus, the German Council for Scientific Information Infrastructures initiated the foundation of the German National Research Data Initiative (NFDI) to address the need for discipline specific research data infrastructures and to conform to the specifications of the European Open Science Cloud (EOSC).

In this context the Mathematical Research Data Initiative (MaRDI) within the NFDI aims at developing a research data infrastructure for mathematics. Starting with the areas of computer algebra, scientific computing, statistics and machine learning, MaRDI will develop standards for confirmable workflows and certifiable mathematical results and provide new services that assist the research cycle up to peer-review in the publication process. Standardised formats, data interoperability and application programming interfaces need to be established to ensure the ease of use of data across broad disciplines. Furthermore, by building the MaRDI portal as a decentralized and federated infrastructure the storage and accessing of data and knowledge will be facilitated in a manner that would perpetuate FAIR and open science principles.

In this talk, we will give an introduction into the notion of mathematical research data and the use cases for a corresponding infrastructure in the mathematical research process and the emerging national and international research data landscape. We present MaRDI's concepts and ideas to implement the FAIR principles for mathematical research data and illustrate them with examples.

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**Sitzung Einordnung:** Invited Talks

**Track Klassifizierung:** Main Track: Track 1