

Overlaps between NFDI Knowledge Graphs

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Abstract:

Knowledge graphs are playing various roles within the research infrastructure landscapes, both within NFDI and beyond. This contribution will cover the MaRDI Portal and its overlaps with other knowledge graphs used in NFDI contexts, particularly as part of the Basic Service KGI4NFDI. The potential scope of these overlaps includes multiple dimensions, such as the graph's purpose, content, tech stack, licensing, community, governance, workflows and integration with other Basic Services. Besides reporting on the present state and some of the developments that led to it, the focus of the presentation will be on potential future developments, with special attention to opportunities and challenges for meaningful cross-graph integration.

These opportunities and challenges will initially be discussed from a mathematical perspective and then generalized a bit. For instance, lots of non-mathematical fields use mathematical modeling in some form or another. Should the information about those mathematical models reside (1) primarily in the (non-mathematical) domain-specific knowledge graphs or (2) primarily in mathematical knowledge graphs or (3) in some combination of both? In case (1), the domain-specific graphs would need to be made aware of some key concepts relating to mathematical models, ideally in a way that is broadly consistent across graphs. Conversely, in case (2), the mathematical knowledge graphs would need to be made aware of some key concepts relating to each of these non-mathematical fields, again ideally in a way that is broadly consistent across graphs. Finally, in case (3), the precise tuning might depend on the field, with implications for the overall landscape of NFDI knowledge graphs. Besides mathematical modeling, another case of interest is the history of mathematics, which comes with similar questions and options in that the knowledge could in principle reside primarily on either the mathematical or the historical end (e.g. in NFDI4Memory) but it would need to be connected in a way that makes sense across research fields, i.e. that the history of mathematics is handled in some manner that is consistent with the respective historical knowledge about other fields like medicine, musicology or materials science. Basic Services for terminologies or identifiers might play a key role here.

Zooming out, it is an interesting exercise to consider a matrix of overlaps between different NFDI projects and existing or potential knowledge graphs in their respective domains, and to ponder how information at the intersections should be handled. For instance, information regarding natural products - i.e. chemicals produced by living systems - would fall within scope of NFDI4Chem and NFDI4Biodiversity (and potentially other NFDI projects), of which only the former currently has a knowledge graph, though non-NFDI knowledge graphs already exist for both domains. Similarly, NFDI4Objects and NFDI-MatWerk might share an interest in - and thus perhaps collaborate on knowledge graph representations of - certain types of objects (e.g. coins or tools). For many pairs (or even groups) of consortia, such overlaps can be readily identified, and this contribution aims to stimulate discussions around that, both in general terms and with an eye on how current or future Basic Services could assist.

Keywords: knowledge graphs, transdisciplinarity, mathematics, collaboration