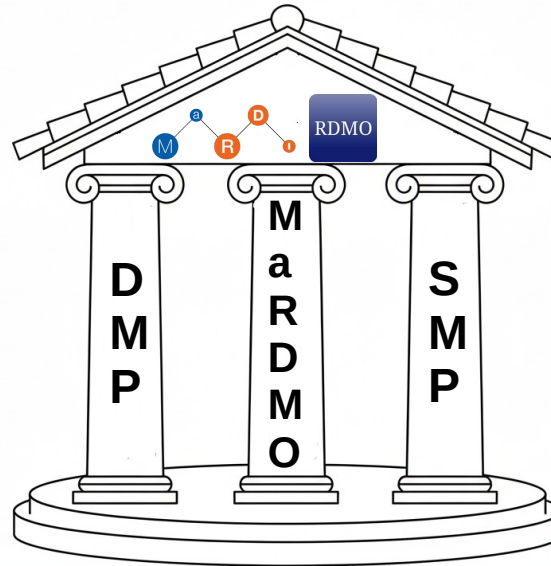


# The MaRDI RDMO Instance

Enabling FAIR and Sustainable Research Data Management for Mathematics

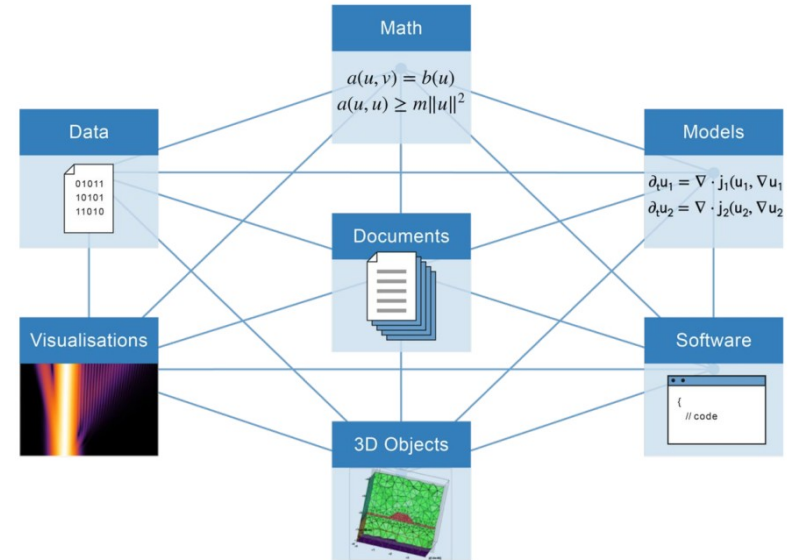


Dr. Marco Reidelbach  
Gamm RSE & RDM Workshop, 05.12.2025

# Research Data in Mathematics

“I have no data, I am just doing math!”

“I don’t know how to assist mathematicians in their RDM efforts.”



Research Data in Mathematics<sup>1</sup>

# How can MaRDI assist?

The screenshot shows the Zenodo interface for the record 'Research Data Management Planning in Mathematics v2'. The header includes the Zenodo logo, a search bar, and links to 'Communities' and 'My dashboard'. Below the header, it states 'Published August 1, 2025 | Version v2' and has buttons for 'Publication' and 'Open'. The title 'Research Data Management Planning in Mathematics v2' is followed by 'The MaRDI Consortium'. A description states: 'This document aims to guide mathematicians and researchers from related disciplines who create research data management (RDM) plans. It highlights the benefits and opportunities of RDM in mathematics and interdisciplinary studies, showcases examples of diverse Math research data and suggests technical solutions that meet the requirements of funding agencies with specific examples. The document will be updated regularly to reflect the latest developments within the mathematical community represented by MaRDI.' Under the 'Files' section, a PDF file 'MaRDI\_RDM\_WhitePaper\_v2.pdf' is listed. A viewer window shows the first page of the whitepaper, which has the title 'Research Data Management Planning in Mathematics' and subtitle 'Whitepaper by MaRDI, the Mathematical Research Data Initiative', dated 'July, 25, 2025'.

## Examples [\[ edit | edit source \]](#)

- [White paper example 1: Bias reduction method](#)
- [White paper example 2: The Schläfli Fan](#)
- [Only LaTeX files in a git](#)

## Bias reduction method [\[ edit | edit source \]](#)

This is the RDMP of the article "[Low SNR in Diffusion MRI Models](#)" by the authors below.

### 1. Data description [\[ edit | edit source \]](#)

We will re-use diffusion weighted neuroimaging available from the [Human Connectome Database](#). The data is stored in data formats (NIFTI) common to the community using the [BIDS standard](#). We will simulate imaging data for the evaluation of the method that provides a gold standard and contains the main artifacts of real imaging data. Data are created using R scripts.

### 2. Documentation and data quality [\[ edit | edit source \]](#)

The experimental data from the Human Connectome Database is described there and organized using the BIDS convention. Data has been acquired with recent and very high standards. Minimal re-processing of the data has been performed at the Human Connectome Database and is documented there.

The simulation data is created by an R-script, which is documented inline to enable the reader to a) reproduce results and b) adjust to own requirements.

### 3. Storage and technical archiving the project [\[ edit | edit source \]](#)

The R code of the method is published within an R package `dti` (version 1.2-4.1) at CRAN as well as mirrored on GitHub and institutional git-repositories at WIAS. The R code for the simulation data and all data analyses as well as the mentioned R package version are published along the scientific paper at its publisher.

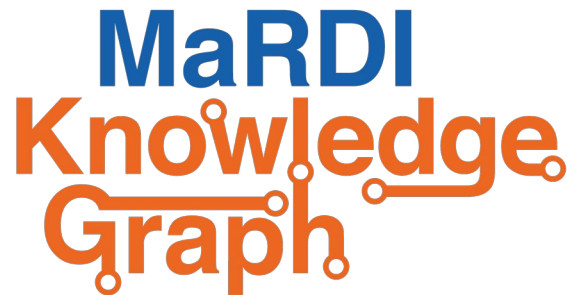


# How can MaRDI assist?

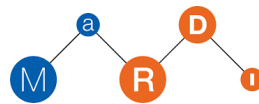


**MathModDB Knowledge Graph** helps organize and link mathematical models, offering structured insights into mathematical modeling and related computational tasks. It enables researchers and students to navigate across mathematical models and expressions, as well as scholarly articles, making it easier to explore connections between research problems from different academic disciplines.

**MaRDI Knowledge Graph** brings together over 5 million items and 500 million relationships from various open mathematical research data sources, e.g. DLMF, CRAN, PolyDB, swMATH, zbMATH Open, arXiv, and OpenML, creating connections between datasets, publications, software, and mathematical concepts.



**MathAlgoDB Knowledge Graph** allows to systematically search algorithms solving problems, publications documenting them, software implementing and benchmarks testing them. The knowledge graph is accessible via a user-friendly interface that allows adding and editing available data.



# Bringing it all together



## Welcome to RDMO

The tool enables researchers that use mathematical data to create a data management plan (DMP) for their research project. After logging in and a one-time activation of your DFN account, you can choose from several templates that guide you through the different aspects of a DMP. In addition, the **MaRDMO Plugin** allows a seamless integration of individual documentations into the MaRDI Portal and other MaRDI services.

We appreciate your feedback

[rdmo@mardi4nfdi.de](mailto:rdmo@mardi4nfdi.de)

Maintenance window

Tuesday 6:30 am - 8:30 am

Login via MaRDI Community AAI

Login via Unity



b4  
nfdi

Universitäts- und  
Landesbibliothek  
Darmstadt

[rdmo.mardi4nfdi.de](https://rdmo.mardi4nfdi.de)

# What is... RDMO?

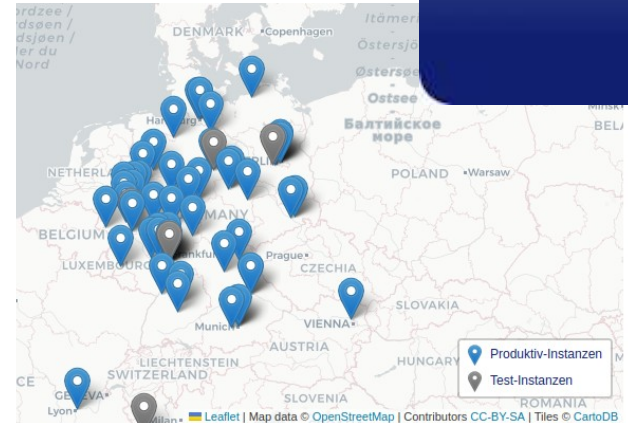
## Research Data Management Organiser

supports research projects in:  
    planning  
    implementation  
    administration  
of all research data management tasks

numerous catalogs from community  
(e.g. DMP, SMP, off-boarding, ...)

plugins for Zenodo, Radar, ...

**2/3 of NFDI consortia want to provide  
RDMO instance to their community**



# DMP and SMP

## DFG Checkliste Catalogue

generic DMP catalogue based on DFG checklist

**How does your project generate new data?** ⓘ

This information is relevant for all types of data in order to be able to understand their genesis.

The way in which data are generated in your project depends on the disciplines involved - for example, it can be 3D modelling, the synthesis of a molecule, self-developed software, an online quantitative survey, etc.

Please select the methodology used to generate the data.

- ☐ Observations (by humans, instruments or sensors)
- ☐ Polls
- ☐ Surveys
- ☐ Laboratory experiments
- ☐ Social science experiments
- ☐ Field experiments
- ☐ Analysis, derivation or compilation from other data sources
- ☐ Calculations
- ☐ Bibliographies
- ☐ Catalogues, repositories or databases
- ☐ Crowdsourcing
- ☐ Web scraping
- ☐ Models
- ☐ Simulations
- ☐ Other:

→ develop math-specific DMP template provide use cases as examples

### Call for incubator projects 01/2026

Open now

We look forward to your application!

Deadline: Dec 15, 2025

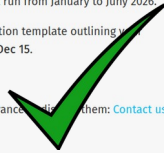
Our first call for incubators is **now open**. The incubator projects will run from January to June 2026.

To propose an incubator project, please complete the short application template outlining your goals, team, and expected outcomes, and **submit the template by Dec 15**.

Download the Template: [.odt](#), [.docx](#), [.pdf](#)

Do you already have ideas for an incubator? Please reach out in advance to inform us about them: [Contact us!](mailto:contact-us@nfdi.de)

Send your submissions (PDF) to [dmp4nfdi@lists.nfdi.de](mailto:dmp4nfdi@lists.nfdi.de).



## SMP Catalogue

from Max Planck Digital Library

### Topic

If you are looking for an introduction to the topic before completing a software management plan, then we recommend Martinez-Ortiz et al. (2022): Practical guide to Software Management Plans, v1.0, <https://doi.org/10.5281/zenodo.7589725>.

### What is the title of the software project?

 ⓘ

The title of the software can, of course, still change or be specified in the course of a project. Nevertheless, it makes sense to give the project a specific name at the beginning in order to facilitate further (internal) communication about it.

### Which research field(s) does this software belong to?

 ⓘ

The list of disciplines follows the **subject classification** of the DFG (German Research Foundation).

Please enter your entries line by line. You can add lines using the green button and remove them using the blue cross (+/-).

+ Entry

### In which application class is the software categorised?

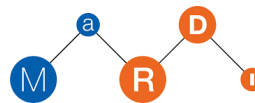
 ⓘ

The application classes are essentially based on the "DLR Software Engineering Guidelines" (<https://doi.org/10.5281/zenodo.1344612>), p. 7-8. Depending on the selection in this questions a selection of different questions is provided below.

► Click here for more information on the application classes for research software

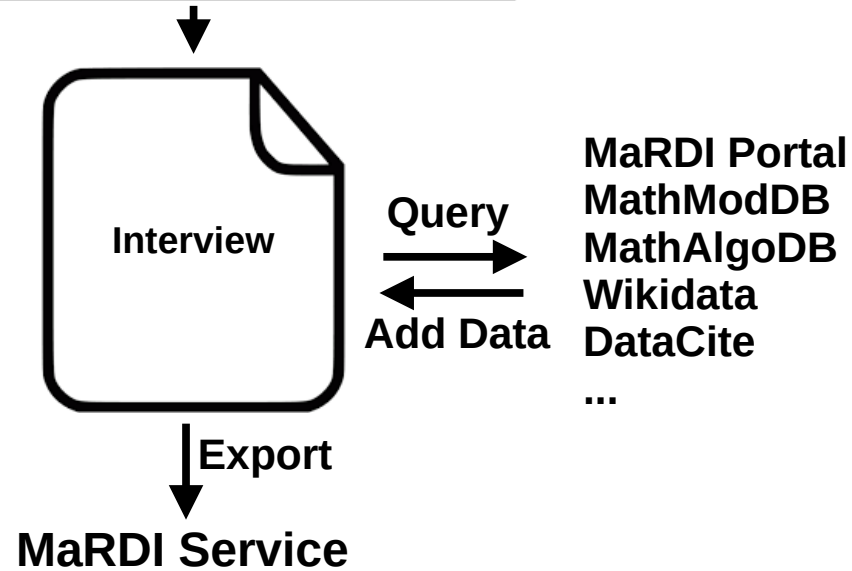
- ☐ Application class 0: The focus of the software is on personal use in conjunction with a small scope. The distribution of the software within and outside the own institution is not planned.
- ☐ Application Class 1: The software is only developed within a narrow scope. It is to be further developed and used beyond personal purposes.
- ☐ Application Class 2: The software is intended to ensure long-term development and maintainability. It is the basis for a transition to product status.
- ☐ Application Class 3: For the software it is essential to avoid errors and to reduce risks. This applies in particular to critical software and that with product characteristics.

→ specific SMP template required?



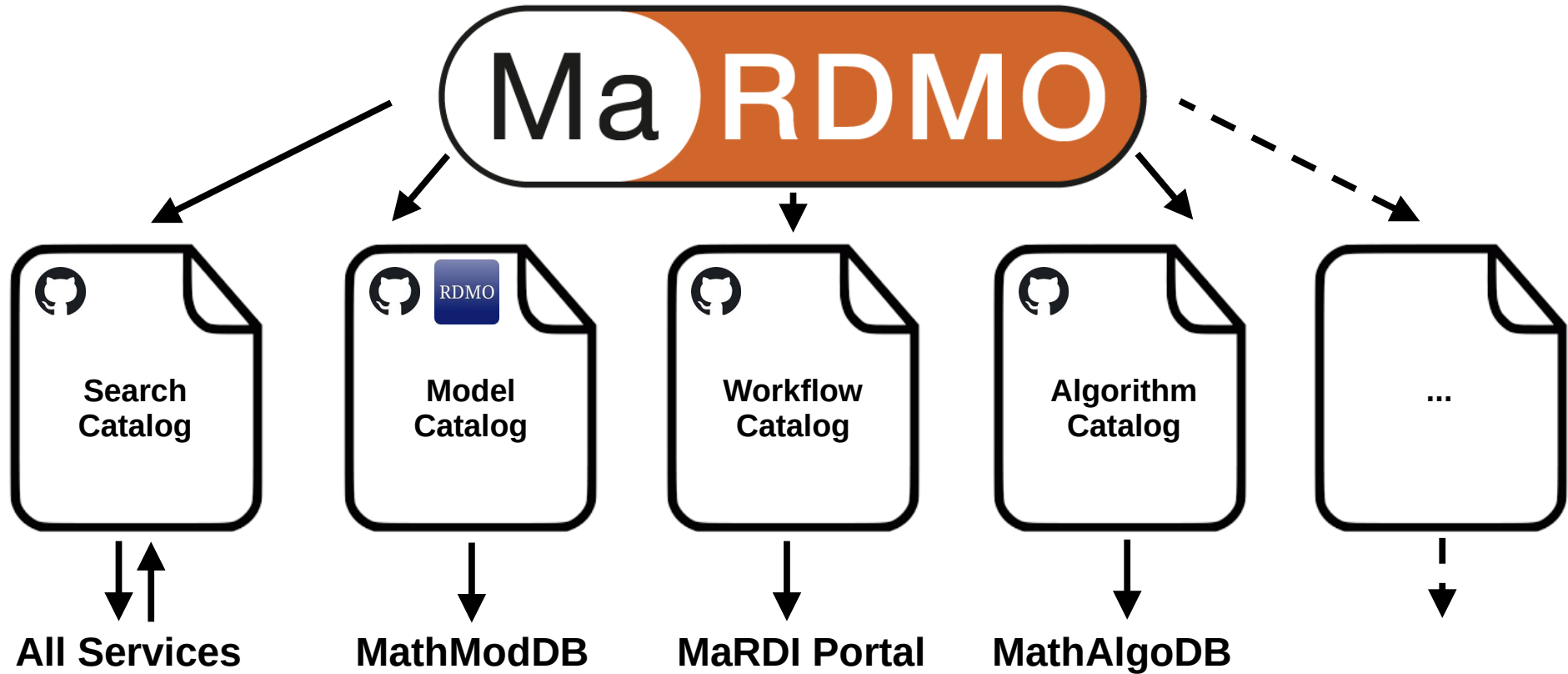


# MaRDMO Plugin (I)





# MaRDMO Plugin (II)



# Example: Research Problem (I)

## Research Problem

On this page, you can define new problems or select existing ones from the MaRDI Portal or Wikidata. When an existing problem is selected, all available information from the relevant source is retrieved and integrated into the interview. Retrieved data can be completed and extended with new relations (e.g., connections to other problems).

In addition to enhancing existing problems, they can also serve as templates for creating new ones. To use a problem as a template, the reference to the external source must be removed after importing the available information.

For a smooth export to the MaRDI Portal, all **non-optional** questions must be answered completely.




**Note:** If a problem is selected from the MaRDI Portal and not used as a template, its existing information cannot be edited or deleted via MaRDMO. Any changes or deletions made regardless will be ignored or shown alongside the original information in the MaRDI Portal.


Check out [Research Problem](#) showcasing the documentation.

Please fill in the form for each tab. The same tabs may be used later on other pages. You can add a new tab using the green button. Once created, you can edit or delete tabs using the buttons in the top right corner.

RPO





+ Set



Select a Research Problem related to the Mathematical Model! 

For all problems *label (description) [source]* is provided. If a problem is chosen, **WAIT** until further information are added to the interview. If no appropriate problem is present in the MaRDI Portal or Wikidata, choose *not found*.

**Note:** To use an existing problem as a template, first select the problem, wait for the information to load, and then change the answer to *not found* to remove the external reference.

chemical wastewater treatment (removing contaminants from wastewater through chemical reactions or adsorption using  

Demo Video



## Ask for Help

### Contact support

If you have a question or feedback please get in touch with us, you can use this form to send an email to the RDMO MaRDI4NFDI support\*

#### Subject

Marco Reidelbach contacted support regarding "Temkin Isotherm Model (EXPORTED)"

#### Message

Greetings!

I have a question regarding the project "Temkin Isotherm Model (EXPORTED)" on the page "Research Problem".

<https://rdmo.mardi4nfdi.de/projects/3224/interview/1656/>

In particular, about the question: Select a Research Problem related to the Mathematical Model

Set: RPO

Answer: chemical wastewater treatment (removing contaminants from wastewater through chemical reactions or adsorption using reactive agents) [mardi]

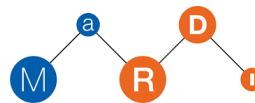
Close

Send message

Query different sources (MaRDI Portal / Wikidata)



All available Information added automatically to Information Section.



# Example: Research Problem (II)

Research Problem Information

**Name of the Research Problem** ⓘ  
**Note:** If you use the problem as a template, don't forget to update the name.

chemical wastewater treatment ⓘ

**Short Description of the Research Problem** ⓘ  
Short description of 2–12 words (max. 250 characters), lowercase only except for proper names, minimal punctuation.  
**Note:** If you use the problem as a template, don't forget to update the short description.

removing contaminants from wastewater through chemical reactions or adsorption using reactive agents ⓘ

**Detailed Description of the Research Problem** ⓘ Optional  
Provide additional context or background information if needed.  
Please enter your entries line by line. You can add lines using the green button and remove them using the blue cross (×).

+ Entry

**Academic Discipline containing the Research Problem?** ⓘ  
For all disciplines *label (description) [source]* is provided. If a discipline is chosen, **WAIT** until further information is added to the interview. If no appropriate discipline is present in the MaRDI Portal or Wikidata, define a new discipline as *label (description) [user]*.  
Please enter your entries line by line. You can add lines using the green button and remove them using the blue cross (×).

environmental engineering (professional engineering discipline related to environmental science) [mardi] ⓘ ✎ ✕ ⌵

+ Entry

## Information Section

- content follows MathModDB
- here:

Label

Description

Long Description (optional)

Academic Discipline containing Research Problem

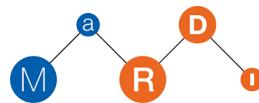
- other:

Formula

QUDT ID

...

→ Information added to Academic Discipline Page



# Example: Research Problem (III)

## Optional Section

- relations follow MathModDB
- here:

specialized by  
specializes  
similar to

- other:  
linearized by  
discretized by

...

**Research Problem - Research Problem Relations**

To relate the problem with other problems, select additional problems and specify the relations.

Please enter your entries block by block. You can add blocks using the green button and remove them using the blue cross (x).

The Research Problem... Optional

specializes

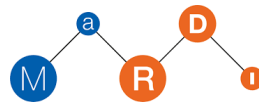
...another Research Problem. Optional

For all problems *label (description) [source]* is provided. Only problems from the MaRDI Portal and those selected or defined within the interview can be chosen.

wastewater treatment (converting wastewater into an effluent for return to the water cycle) [mardi]

+ Block

Back Proceed



# Direct Export to MaRDI Portal

## Temkin Isothem Model (EXPORTED)

Description	
No description available.	
Catalog	<b>MaRDMO: Questionnaire for Mathematical Models</b> This catalog helps you describe mathematical models using the MathModDB ontology. It covers key elements such as the model itself, computational tasks, mathematical expressions, quantities, research problems, academic disciplines, and publications. You can reuse existing entries from the MaRDI Portal or Wikidata, or create new ones. The catalog supports documenting new models, adding research problems, or adding computational tasks. It follows the FAIR principles to make models findable, accessible, interoperable, and reusable, and is part of the MaRDMO project developed within the MaRDI initiative. Completed documentations can be exported directly to the MaRDI Portal. Check out <a href="#">MaRDMO Model Documentation</a> showcasing the documentation and subsequent export.

**Options**


- Answer questions
- View answers
- Update project information
- Update project catalog
- Update parent project
- Update project tasks
- Copy project
- Delete project
- Add member
- Create snapshot
- Back to projects overview

**Export**

- RDMO XML
- CSV (comma separated)
- CSV (semicolon separated)
- JSON
- MaRDMO Button**

**Import values**

Import from file

Select file 

**Tasks**

Tasks are generated automatically from the answers given in the project. On the page of each task you can see which of your answers lead to the activation of the task.

No active tasks found.

**Members**

Here you can see who can access the project and invite additional members. You can use the user roles to manage which rights the benefits have. Unless you are the last owner, you can leave the project with the button next to your name.

User	E-Mail	Role
Marco Reidelbach	reidelbach@zib.de	Owner

**Snapshots**

Snapshots allow you to save all responses at a given point in time and preserve a certain stage of the project. Later the snapshot can be used to create views, and the project can also be reset to a previous snapshot if needed.

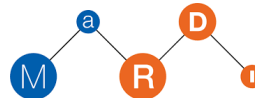
No snapshots found.



Create new Items 

Create new Statements ...

Documentation – Preview – Login to MaRDI Portal – Insert Data



# Documented Model

Freundlich isotherm model (Q6775713) [Add languages](#)

[Item](#) [Discussion](#) [Read](#) [View history](#) [Tools](#)

From MaRDI portal



**This is the item page for this Wikibase entity, intended for internal use and editing purposes.**

**Please use this page instead for the normal view:** [Freundlich isotherm model](#)

mathematical model for equilibrium adsorption of solutes on heterogeneous surfaces



[In more languages](#)

Configure

Language	Label	Description	Also known as
English	Freundlich isotherm model	mathematical model for equilibrium adsorption of solutes on heterogeneous surfaces	
German	No label defined	No description defined	
American English	No label defined	No description defined	

Freundlich isotherm model

[Add languages](#)

[Model](#) [Discussion](#)

[Read](#) [Edit](#) [Edit source](#) [View history](#) [Tools](#)

From MaRDI portal

Model:6775713

[Community](#): [MathModDB](#)

[deterministic model](#) [dimensional model](#) [mathematical model](#) [nonlinear model](#) [static model](#)

Available identifiers [\[ edit source \]](#)

[Wikidata](#) [Q6775713](#)

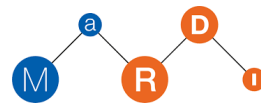
**mathematical model for equilibrium adsorption of solutes on heterogeneous surfaces, named after Herbert Freundlich**

[Description](#)

The Freundlich isotherm model is an empirical adsorption model that describes how solutes adhere to heterogeneous surfaces with varying affinities. It accounts for multilayer adsorption rather than a single uniform layer. The model is widely applied in environmental and chemical engineering to study pollutant adsorption on materials such as activated carbon, soil, and biochar.

Knowledge Graph Entry

Rendered Wikipage



Thank You,  
for your Attention!