

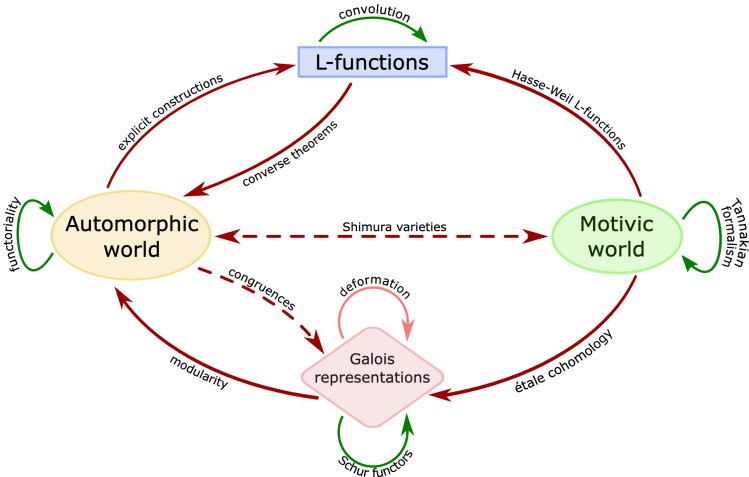
The L-functions and Modular Forms DataBase

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The LMFDB is a collection of databases centered around the Langlands program, which relates complex analytic functions (like L-functions and zeta functions), Galois representations (such as Tate-modules of elliptic curves) and automorphic forms and representations (modular forms).



Demo

beta.lmfdb.org

Sections of the LMFDB

- **L-functions** – rational and otherwise
- **Modular forms** – classical, Hilbert, Bianchi, Maass, Siegel
- **Varieties** – elliptic curves over $\mathbb{Q}$ and over number fields, genus 2 curves, modular curves, higher genus families, abelian varieties, Belyi maps
- **Fields** – number fields and p -adic fields
- **Groups** – abstract finite groups, permutation groups, Sato-Tate groups, and lattices
- **Representations** – Artin representations and Dirichlet characters
- **Motives** – hypergeometric

Statistics

Size

About 3TB static (Riemann zeta zeros and class groups of imaginary quadratic fields) and 2TB searchable data, 450GB of search indexes ([more details](#)).

Number of objects

24M L-functions, 850k modular forms, 7.5M varieties (with 34M modular curves coming soon), 21M fields, 1M groups, 30M Dirichlet characters, 650k Artin representations, 60k families of hypergeometric motives.

Statistics for each section

Most sections of the LMFDB have a [statistics page](#).

User interface

- Two versions of the website:
 - ① lmfdb.org – hosted on google cloud,
 - ② [beta](#) – hosted at MIT, includes more preliminary sections like modular curves, hypergeometric motives and lattices.
- Runs an [open source Flask](#) frontend, allowing for templated webpages that are filled in from the database.
- The backend uses [PostgreSQL](#), with data access also available through the [API](#) or [Python](#).

Features

- Knowls – often used for defining terms, expand on the same page. Editable online.
- Aim at both experts and novices. Both search and browse modes, interesting examples.
- Completeness – describe regimes in which data is complete. Soon in search results.
- Source and reliability – describe how data was computed, any assumptions used and verifications made
- Results can be further refined, resorted, with displayed columns customized.
- Properties box (often with a picture) and related objects.
- Aim to have downloads in various formats.
- Each object has a mathematically meaningful label and homepage.