

Supporting Data-Driven Mathematics

*Online databases made easy
(for simple datasets)*

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Some Famous Online Combinatorial Math Databases

Feedback · Hide Menu

LMFDB - The L-functions and Modular Forms Database

Introduction and more

Introduction Features
Universe News

L-functions

Degree: 1 2 3 4

ζ zeros

Modular Forms

GL(2) Classical Maass
Hilbert Bianchi

Varieties

Curves
Elliptic:
/Q
/NumberFields
Genus 2:
/Q
Higher genus:
Families
Abelian Varieties:
/F_q

A Database

The LMFDB is an extensive database of mathematical objects arising in Number Theory.

Sample lists: L-functions, Elliptic curves, Maass forms, Tables of zeros, Number fields

Hall of Fame

Riemann zeta function
Ramanujan Δ function and its L-function
C277 and its L-function
Gauss elliptic curve and its L-function
Grand Canyon L-function

Search and Browse

Search for objects with specific properties, or browse categories.

Browse: L-functions, Modular forms, Elliptic curves, Number fields

Visualize Data

Explore individual plots or view distributions of various objects.

Examples: GL(4) Level one Maass forms. Isogeny graph of elliptic curve 102.c

lmfdb.org

Login

FindStat

Finder All Collections All Maps All Statistics Create Map Create Statistic Usage Contributors Citations Interface

— database and search engine for combinatorial statistics and maps —

This **collaborative project** is

- a **database of combinatorial statistics and maps** on combinatorial collections and
- a **search engine**, identifying your data as the **composition of known maps and statistics**.
 - a **combinatorial collection** is a collection $S = \bigcup_x S_x$ of finite sets S_x (e.g. the [set of permutations](#))
 - a **combinatorial map** is a map $\phi : S \rightarrow S'$ between collections (e.g. the [inverse of a permutation](#))
 - a **combinatorial statistic (or parameter)** is a map $st : S \rightarrow \mathbb{Z}$ (e.g. the [order of a permutation](#))
 - the database currently contains **1435 statistics** and **146 maps** on **22 collections**

There is a [detailed usage example](#) and several [MathOverflow discussions](#) with examples of the database usage.

[read more...](#)

go to **statistic finder**

go to **map finder**

findstat.org

This site is supported by donations to [The OEIS Foundation](#).

0 1 3 6 2 7
13
23 15 20
10 22 11 21

THE ON-LINE ENCYCLOPEDIA
OF INTEGER SEQUENCES®

founded in 1964 by N. J. A. Sloane

The On-Line Encyclopedia of Integer Sequences® (OEIS®)

Enter a sequence, word, or sequence number:

[Hints](#) [Welcome](#) [Video](#)

oeis.org

The Other 80% (or more)

[N,i]	V	E	Tr	W?	B?	AG
C4[5,1]	5	10	DT	W	NB	120
C4[6,1]	6	12	DT	U	NB	48
C4[8,1]	8	16	DT	U	Bip	$(2^7)(3^2)$
C4[9,1]	9	18	DT	W	NB	72
C4[10,1]	10	20	DT	U	NB	320
C4[10,2]	10	20	DT	W	Bip	240
C4[12,1]	12	24	DT	U	Bip	768
C4[12,2]	12	24	DT	W	NB	48
C4[13,1]	13	26	DT	W	NB	52
C4[14,1]	14	28	DT	U	NB	$(2^8)(7^1)$
C4[14,2]	14	28	DT	W	Bip	336
C4[15,1]	15	30	DT	W	NB	60
C4[15,2]	15	30	DT	W	NB	120
C4[16,1]	16	32	DT	U	Bip	(2^{12})
C4[16,2]	16	32	DT	W	Bip	384
C4[17,1]	17	34	DT	W	NB	68
C4[18,1]	18	36	DT	U	NB	$(2^{10})(3^2)$
C4[18,2]	18	36	DT	W	Bip	144
C4[20,1]	20	40	DT	U	Bip	$(2^{12})(5^1)$
C4[20,2]	20	40	DT	W	Bip	80
C4[20,3]	20	40	DT	W	NB	320
C4[20,4]	20	40	SS	U	Bip	$(2^8)(3^1)(5^1)$
C4[21,1]	21	42	DT	W	NB	84
C4[21,2]	21	42	DT	W	NB	336

Wilson, Potočník; A Census of edge-transitive tetravalent graphs

- [Graphs of order 4 to 300](#) (18 MB)
- [Graphs of order 302 to 500](#) (66 MB)
- [Graphs of order 502 to 600](#) (69 MB)
- [Graphs of order 602 to 700](#) (84 MB)
- [Graphs of order 702 to 800](#) (114 MB)
- [Graphs of order 802 to 900](#) (147 MB)
- [Graphs of order 902 to 1000](#) (183 MB)
- [Graphs of order 1002 to 1050](#) (164 MB)
- [Graphs of order 1052 to 1100](#) (113 MB)
- [Graphs of order 1102 to 1150](#) (103 MB)
- [Graphs of order 1152 to 1200](#) (234 MB)
- [Graphs of order 1202 to 1250](#) (137 MB)
- [Graphs of order 1252 to 1280](#) (131 MB)

Potočník, Spiga, Verret; A census of small connected cubic vertex-transitive graphs

```

CubicVT:=[] : i in [1..1280]]];

CubicVT[4,1] := Graph<4 | {{1,3}, {1,4}, {2,4}, {2,3}, {1,2}, {3,4}}>;

CubicVT[6,1] := Graph<6 | {{2,5}, {1,3}, {2,6}, {1,4}, {3,5}, {4,6}, {2,3}, {1,6}, {4,5}}>;

CubicVT[6,2] := Graph<6 | {{1,3}, {1,5}, {2,6}, {5,6}, {4,5}, {2,4}, {1,2}, {3,4}, {3,6}}>;

CubicVT[8,1] := Graph<8 | {{2,8}, {1,5}, {1,7}, {7,8}, {4,8}, {5,6}, {6,7}, {4,5}, {1,2}, {2,3}, {3,4}, {3,6}}>;

CubicVT[8,2] := Graph<8 | {{1,8}, {2,6}, {6,8}, {4,7}, {1,4}, {4,5}, {5,8}, {1,2}, {2,7}, {3,7}, {3,5}, {3,6}}>;

CubicVT[10,1] := Graph<10 | {{4,6}, {3,5}, {2,6}, {4,8}, {5,6}, {3,4}, {1,5}, {1,10}, {2,10}, {7,9}, {3,7}, {9,10}, {1,7}, {2,8}, {8,9}}>;

CubicVT[10,2] := Graph<10 | {{4,6}, {3,5}, {3,6}, {4,5}, {8,10}, {1,3}, {6,8}, {1,9}, {5,7}, {7,10}, {9,10}, {2,4}, {1,7}, {2,8}, {2,9}}>;

CubicVT[10,3] := Graph<10 | {{2,6}, {6,7}, {4,8}, {3,9}, {1,3}, {4,10}, {6,8}, {5,9}, {1,4}, {1,2}, {2,5}, {7,10}, {3,7}, {8,9}, {5,10}}>;

CubicVT[12,1] := Graph<12 | {{12,10}, {11,7}, {3,9}, {3,7}, {11,9}, {2,4}, {6,10}, {1,9}, {12,5}, {1,5}, {11,6}, {7,8}, {6,8}, {3,5}, {4,10}, {12,2}, {4,8}, {1,2}}>;

```

Beginnings



WEBSITE

Postgres

export

SAGE PACKAGE

SQLite

export

DATA REPOSITORY

Janoš Vidali



Janoš's SageMath package

Compare objects
(both ways!)

```
sage: G = CVTGraph(10, 3)
sage: G.is_isomorphic(graphs.PetersenGraph())
True
```

Use the object info to query the database

```
sage: gen = info.all(is_partial_cube, orderby=order) # sort by num. of vcs.
sage: next(gen) # first matching graph
3-Cube: cubic vertex-transitive graph on 8 vertices, number 2
sage: next(gen) # second matching graph
6-Prism: cubic vertex-transitive graph on 12 vertices, number 3
```

```
sage: info.count(cvt_index) # number of graphs in the CVT census
111360
sage: info.count(cvt_index, groupby=girth) # break down by girth
{3: 160, 4: 5754, 5: 100, 6: 58674, 7: 192, 8: 13529, 9: 219,
 10: 25806, 11: 80, 12: 5423, 13: 37, 14: 1365, 15: 12, 16: 9}
```

Search

Graphs [?]

Maniplexes [?]

- ☐ vertex transitive graphs
- ☒ cubic vertex transitive graphs
- ☐ cubic arc transitive graphs

is partial cube [?]



not is prism [?]



chromatic index [?]

clique number [?]

connected components number [?]

diameter [?]

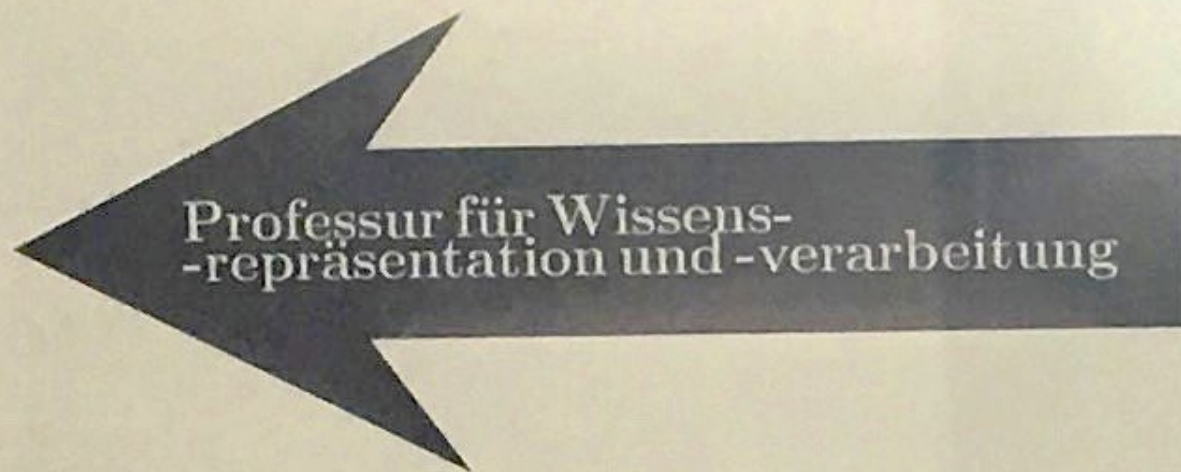
girth [?]

Matches found: 4

Display results

♥ [Choose columns](#)

order	CVT	diameter	girth	is arc transitive	is cayley	is hamiltonian
20	7	5	6	true	false	true
24	11	6	4	false	true	true
48	29	9	4	false	true	true
120	60	15	4	false	true	true



Professur für Wissens-
-repräsentation und -verarbeitung



*Anything you can do,
we can do **META!***



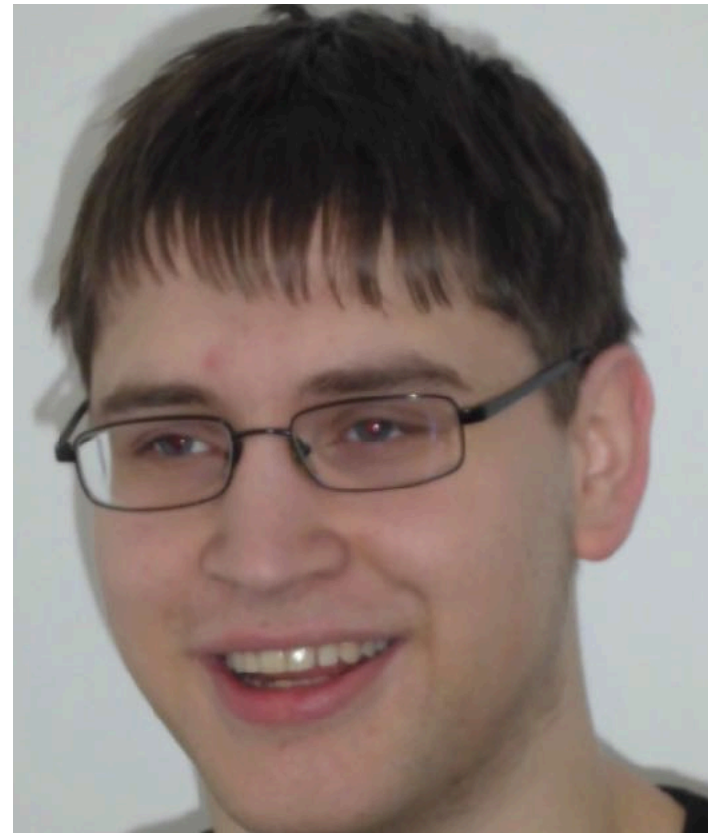
FRIEDRICH-ALEXANDER
UNIVERSITÄT
ERLANGEN-NÜRNBERG



Michael Kohlhase

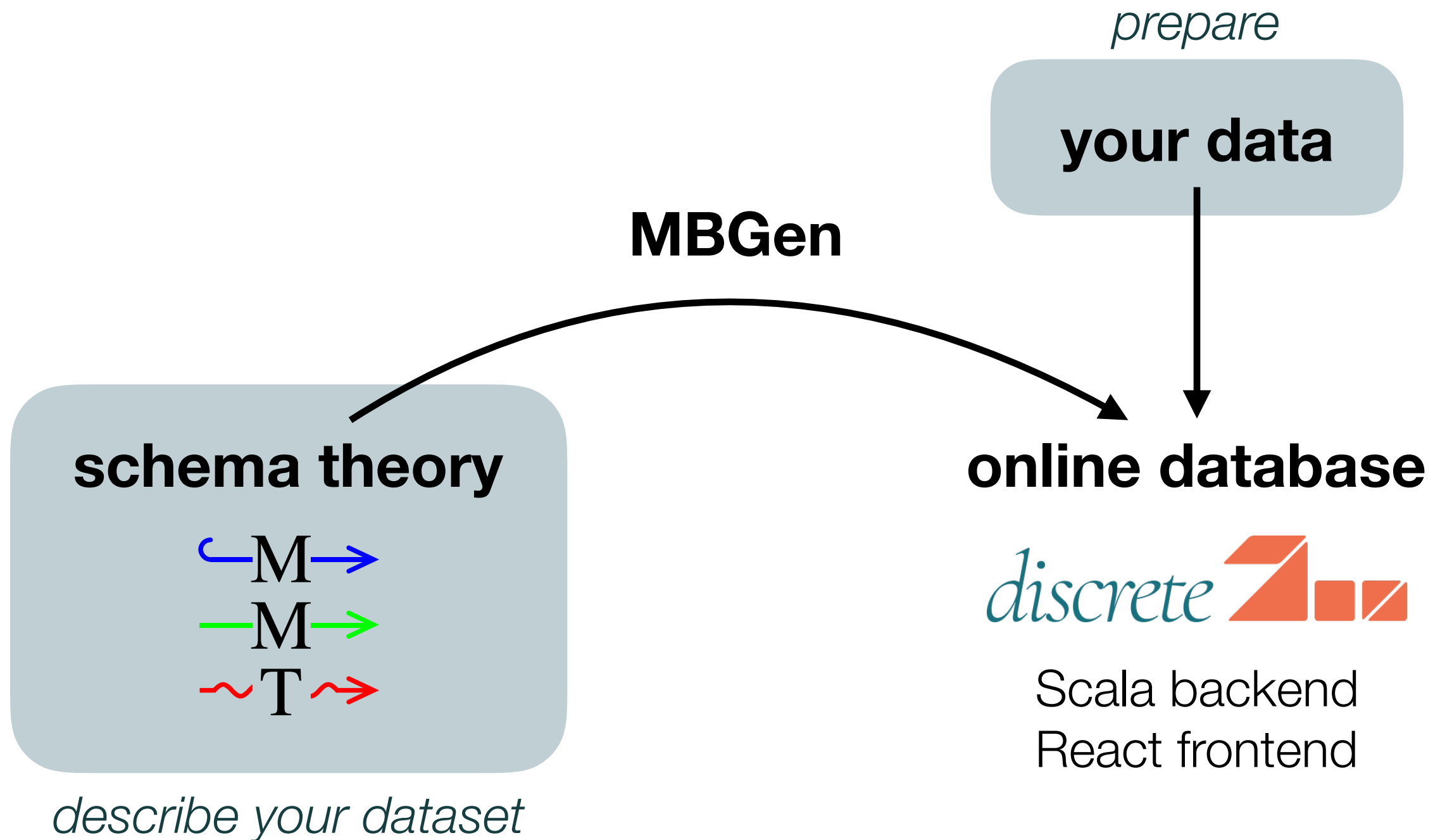


Florian Rabe

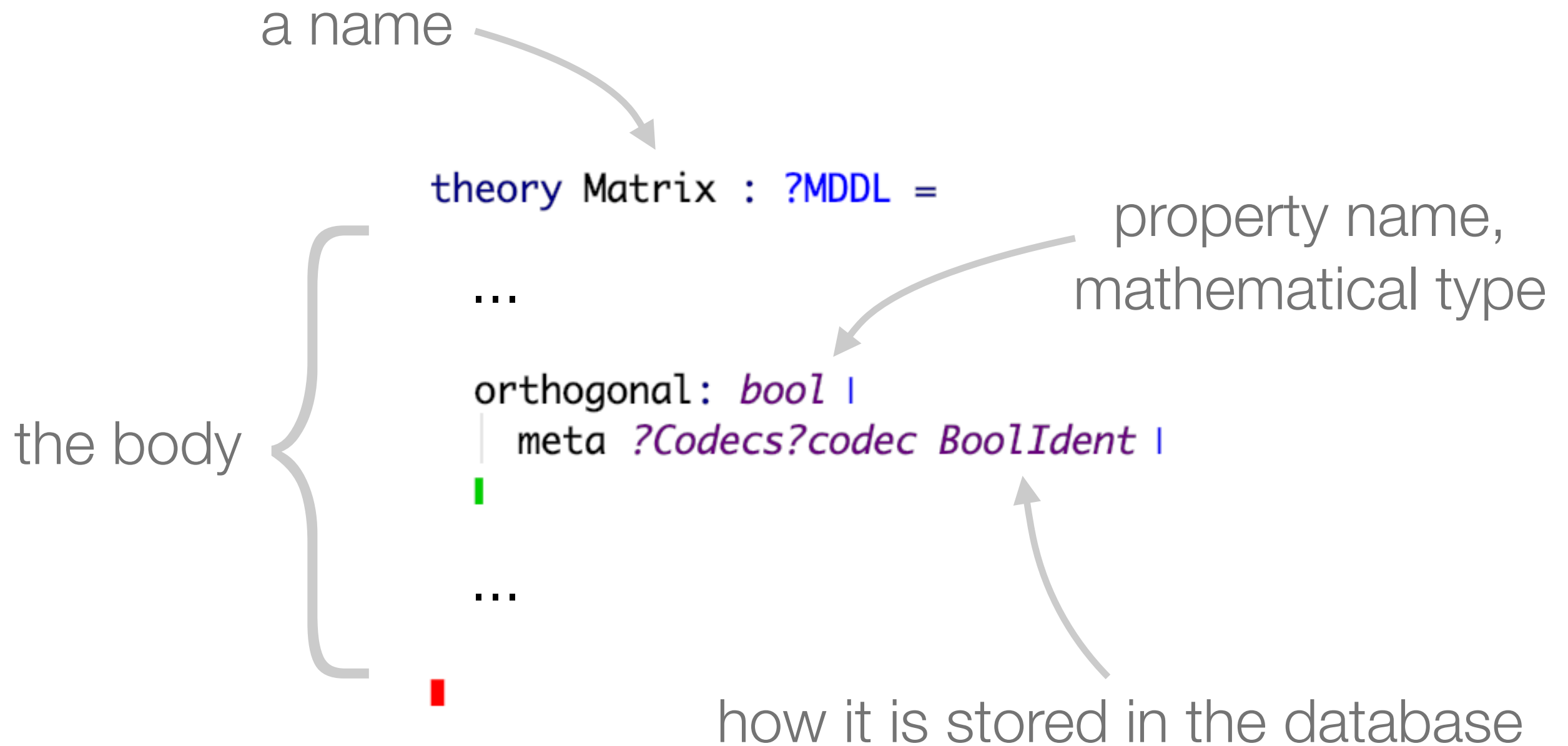


Tom Wiesing

From a dataset to an online database



Anatomy of a schema theory



Take-away points

If you would like to use this project for your data, please contact me!

katja.bercic@fau.de

You can also help with gathering information about math datasets:

mathdb.mathhub.info



— OPEN —
DREAMKIT

A big thanks goes to OpenDreamKit.
It made the existence of this project possible and gave it a big boost.

namespace <http://data.mathhub.info/schemas> ■

```
theory MatrixS : ?MDDL =  
  meta ?MDDL?schemaGroup "Joe" ■  
  
  mat: matrix int 2 2 |  
    meta ?Codecs?codec MatrixFromArray IntIdent |  
    tag ?MDDL?opaque |  
  ■  
  
  trace: int |  
    meta ?Codecs?codec IntIdent |  
  ■  
  
  orthogonal: bool |  
    meta ?Codecs?codec BoolIdent |  
  ■  
  
  eigenvalues: list int |  
    meta ?Codecs?codec ListFromArray IntIdent |  
    tag ?MDDL?opaque |  
  ■
```