discrete

A repository of graphs and other discrete objects

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Joint work with Katja Berčič

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Idea

- There are various censuses of graphs and other discrete objects in the literature and the internet.

- We want these objects to be easily accessible.

- Furthermore, we want to have precomputed properties that can be used for searching.

DiscreteZOO

- We gather the censuses into a database.

- The data can be accessed via the website

  discretezoo.xyz

- A Sage package is also available at

  github.com/DiscreteZOO

Where we are now

- Censuses
  - All connected cubic vertex-transitive graphs with at most 1280 vertices (by P. Potočnik, P. Spiga and G. Verret),
  - all connected cubic arc-transitive graphs with at most 2048 vertices (from the extended Foster census by M. Conder), and
  - all vertex-transitive graphs with at most 31 vertices (by G. Royle).

- Computed properties
  - Basic graph properties (order, degree, diameter, girth, . . .),
  - automorphism group related properties (vertex-, edge-, arc-, distance-transitivity),
  - some other properties (is Hamiltonian, is Cayley, is partial cube, . . .).

Where we are not quite yet

(but we are working on it!)

- More graphs

- More precomputed properties

- Nice images of graphs

- Other combinatorial objects
    - Finite groups, polytopes, maniplexes, geometries, . . .
    - Feasible parameter sets for objects
      (e.g. distance-regular graphs)

- Your wishes?

Applications

The data from DiscreteZOO
has been used in the following research.

📄 T. Marc.
Classification of vertex-transitive cubic partial cubes.
J. Graph Theory, 86(4):406–421, 2017.

📄 P. Potočnik and J. Vidali.
Cubic girth-regular graphs of small girth.
To be submitted.

📄 P. Potočnik and J. Vidali.
Cubic vertex-transitive graphs of girth six.
To be submitted.

Demo

Notebook available at

github.com/DiscreteZOO/DiscreteZOO-presentations

Questions, ideas?