A repository of graphs and other discrete objects

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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?