Generating Small Graphs up to Isomorphism

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Goal of the project

Specialized graph iterator

- No isomorphic graphs
- Given number of nodes
- Other, preferably vertex-hereditary graph properties

Property examples

- Triangle-free
- Connected
- Bipartite
- Upper and lower bounds for degrees
- Upper and lower bounds for number of edges
- Logical combinations of other properties (and, or, not)

The basics of the graph-generating algorithm

A search-tree of graphs:

- The root is K_1
- The leaves are the output

Let H be one of $G's$ children.

- $V(H) = V(G) + w$
- $E(H) \supseteq E(G)$ and all new edges are incident to w

$H_1 \nsim H_2$ for graphs on each level

- Handled by <u>canonization</u>

Keep graph properties

- Handled by <u>graph filters</u>

Our work this semester

- Understanding theory
- Graph implementation
- Base for the complete graph generator
- Canonization algorithm implementation