Discovering Graph Theory Relationships Using a Graph Database

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Outline

Graph Database

`http://math.byu.edu/~grout/graphs`

- All (13,598) graphs up through 8 vertices.
- Includes data on most major graph invariants.
- Includes pictures of graphs.
- Easily searchable.

I can email you several pages of exercises to use with the database.

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Students are

- Motivated and exploring examples;
- Conjecturing relationships;
- Proving or disproving conjectures;
- Checking their work.

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Potential Problem: Arbitrary Relationships

Relationships can seem arbitrary and unmotivated.

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The sum of the degrees of the vertices is twice the number of edges.

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Large data sets make conjecturing difficult.

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Conjecture and prove a relationship between the degrees of a graph and whether the graph is Eulerian or not.

(Only 15 out of the 143 connected graphs on 6 or less vertices are Eulerian).

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Summary

The graph database can help with the problems of:

- Motivating students to conjecture relationships;
- Exploring large numbers of examples easily;
- Checking work.

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