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Automated conjecturing for proof discovery.

CONJECTURING is an open-source Sage program which can be used to make invariant-relation or property-relation conjectures for any mathematical object-type. The user must provide at least a few object examples, together with functions defining invariants and properties for that object-type. These invariants and properties will then appear in the conjectures.

Here we demonstrate how the CONJECTURING program can be used to produce proof sketches in graph theory. In particular, we are interested in finding a new proof of the Friendship Theorem: if every pair of vertices of a graph has a unique common neighbor, then the graph is a vertex adjacent to all other vertices.

We will discuss the program and give examples. This is joint work with Nico Van Cleemput (Ghent University). (Received September 09, 2016)