ABSTRACT

THESIS: New Classes of Graceful Spiders and Related Computational Results

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The conjecture that all trees are graceful is one of the most famous open problems in graph theory. This thesis focuses on the class of spider graphs, a subclass of trees that has thus far not been proven to be universally graceful. We present classes of spiders already known to be graceful, explore methods for extending graceful graphs, and apply these methods to create new classes of graceful spiders. Additionally, we generate all possible graceful labelings for spiders of order 16 or less, and explore properties of these labelings, offering several conjectures and minor results relating to the graceful labeling of spiders.