

# A Preprocessor for a Magic Venn Diagrams Solver

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A *Magic Venn Diagram (MVD)* is a Venn diagram where given regions are labeled such that the labels of the regions of each set add up to the same *magic sum*. Magic Venn Diagrams establish a framework that encompasses various magic figures, like magic squares and magic graphs. One problem that arises in the study of Magic Venn Diagrams is counting the number of non-isomorphic MVDs for given regions and labels. We have implemented an algorithm that determines all MVDs for given regions and labels using a branch-and-bound approach. A preprocessor detects specific regional structures, like circular structures that arise in edge- and vertex-magic cycle graphs, for example. The result of the preprocessor is used to prevent isomorphic MVDs from being generated by the solution algorithm and significantly speeds up the solution process.