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Graphs, graph polynomials with applications to antiprisms

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Masters of Science in the School of Mathematics

Graphs, graph polynomials with applications to antiprisms

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Abstract

The n-antiprism graph is not widely studied as a class of graphs in graph theory hence there is not much literature.

We begin by defining the n-antiprism graph and discussing properties, which we prove in the thesis, and which have not been previously presented in graph theory literature. Some of our significant results include proving that an n-antiprism is 4-connected, 4-edge connected and has a pathwidth of 4.

A highly studied area of graph theory is the chromatic polynomial of graphs. We investigate the chromatic polynomial of the antiprism graph and attempt to find explicit expressions for the chromatic polynomial of the antiprism graph. We express this chromatic polynomial in several forms to discover the best-suited form.

We then explore the Tutte polynomial and search for an explicit expression of the Tutte polynomial of the antiprism graph. Using the relationship between a graph and its dual graph, we provide an iterative expression of the Tutte polynomial of the antiprism graph.

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