

Parity Property of Hexagonal Sliding Puzzles

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Abstract

We study the puzzle graphs of hexagonal sliding puzzles of various shapes and with various numbers of holes. The puzzle graph is a combinatorial model which captures the solvability and the complexity of sequential mechanical puzzles. Questions relating to the puzzle graph have been previously studied and resolved for the 15 Puzzle which is the most famous, and unsolvable, square sliding puzzle of all times. The puzzle graph is also a discrete model for the configuration space of hard tiles (hexagons or squares) moving on different tessellation-based domains. Understanding the combinatorics of the puzzle graph leads to understanding some aspects of the topology of these configuration spaces.

Keywords: puzzle graph, The 15-Puzzle.