

Saved by the rook

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Abstract

The rook graph G is a graph whose edges represent all the possible legal moves of the rook chess piece on a chessboard. The problem we consider is the following. Given any set M containing pairs of cells such that each cell of the $m_1 \times m_2$ chessboard is in exactly one pair, we determine the values of the positive integers m_1 and m_2 for which it is possible to construct a closed tour of all the cells of the chessboard, that is a Hamiltonian cycle, which uses all the pairs of cells in M and possible moves of the rook.