Conway's Solitaire Army Problem

John Engbers

Peg solitaire is a common single-player game played on a board where every position but one starts occupied by pegs, and the goal is to use horizontal and vertical "checkers" style jumps to eliminate all but one of the pegs. John Conway's aggressive modification of the game asks the question: Given an army with soldiers on the integer lattice points of the lower half-plane (the new board), how far above the x-axis can the army place a soldier using these jumps? We present his surprising answer using the beautiful idea of pagoda functions, and then discuss one of many extensions to the problem.

Surprisingly, very little mathematics beyond geometric series is needed, which should be a welcome respite at the end of the first day post-Spring Break.